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Science

Main Book



5

Primary
First Term

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Unit 1 Interactions of Organisms



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Theme

1

Systems

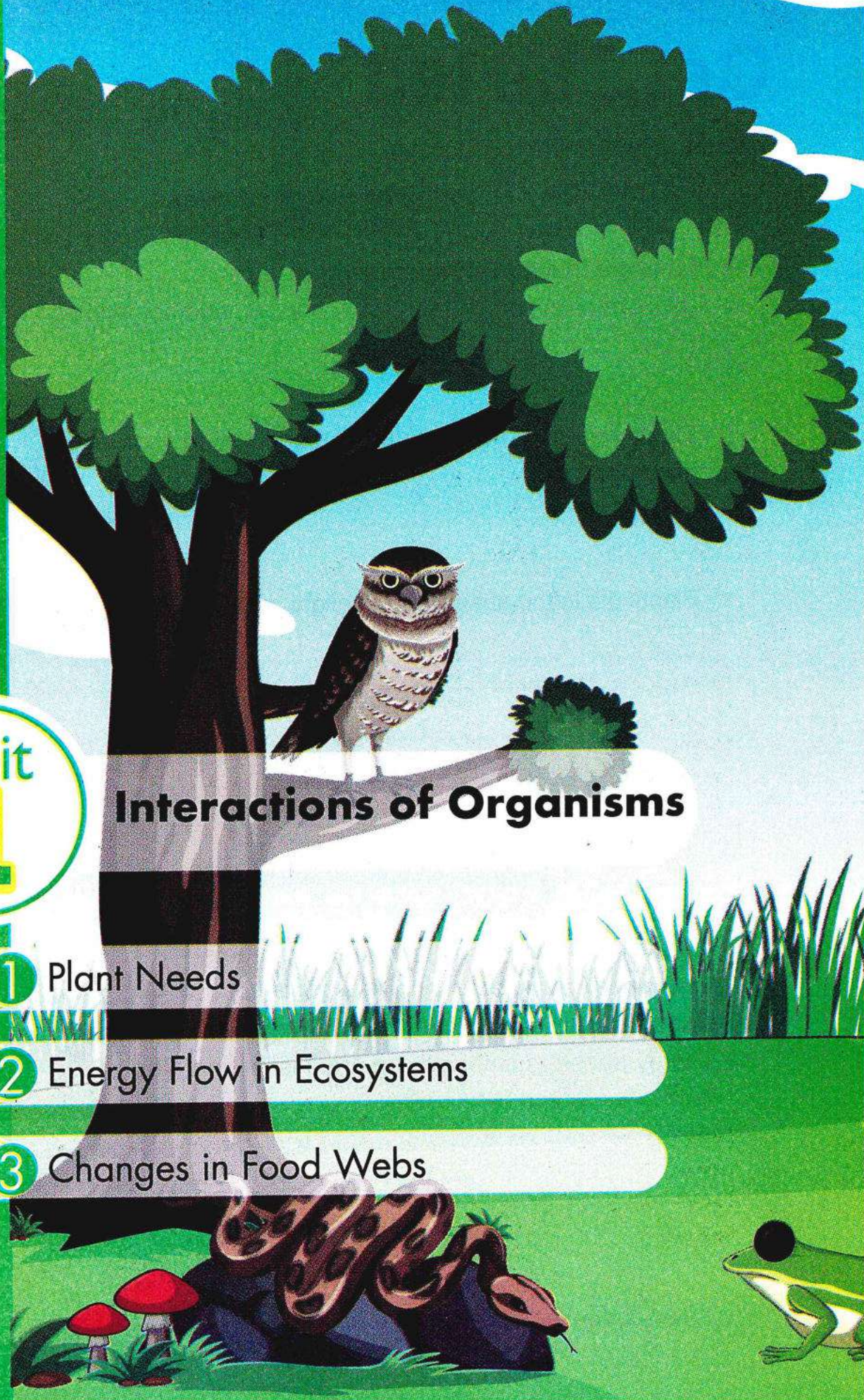
Unit
1

Interactions of Organisms

Concept 1 Plant Needs

Concept 2 Energy Flow in Ecosystems

Concept 3 Changes in Food Webs



Get Started

What I Already Know

Plant Needs

- » Plants are found everywhere around us.
- » A plant consists of **roots**, **stems**, **leaves**, and sometimes **flowers** or **fruits**.
- » What do you think the plants need to grow healthy?

- Plants need **sunlight**, **water**, **air**, and **soil** to grow healthy.



- Plants die in the absence of sunlight, water, or air.



• احتياجات النبات:

– توجد النباتات في كل مكان حولنا. – يتكوّن النبات من الجذور والساق والأوراق، وأحياناً تنبت الزهور أو الثمار.

• برأيك: ماذا يحتاج النبات لينمو بشكل صحي؟

– يحتاج النبات لضوء الشمس والماء والهواء والتربة؛ لينمو بشكل صحي.

– يموت النبات في حالة عدم توافر ضوء الشمس أو الماء أو الهواء.

Food Chains and Food Webs

- » A squirrel needs energy to survive, so it eats **leaves**, **fruits**, **insects**, and **bird chicks**.
- » Larger animals eat squirrels to get energy.
- » Energy transfers among living organisms through **food chains** and **food webs**.



• السلاسل الغذائية والشبكات الغذائية:

– يحتاج السنجاب إلى الطاقة للبقاء حيث يأكل العديد من الأوراق، والفواكه، والحشرات، وصغار الطيور.

– تأكل الحيوانات الأكبر حجماً السنجاب؛ للحصول على احتياجاتها من الطاقة.

– تنتقل الطاقة من كائن حي لآخر عن طريق السلاسل الغذائية والشبكات الغذائية.

Concept

1.1

Plant Needs



Concept 1

Plant Needs

Lesson 1

- Activity 1 Can You Explain?
- Activity 2 Tree Needs
- Activity 3 What Do You Already Know About Plant Needs?

Lesson 2

- Activity 4 Do Plants Need Soil?
- Activity 5 Sunlight: A Basic Need

Lesson 3

- Activity 6 Parts of a Plant
- Activity 7 Up the Stem

Lesson 4

- Activity 8 Comparing Plant and Human Systems
- Activity 9 Plant Food
- Activity 10 Flowers and Seeds

Lesson 5

- Activity 11 Seed Dispersal
- Activity 12 Record Evidence Like a Scientist

Glossary

Lesson (1)

Activity (1)

Seed	بذرة	Fruits	ثمار	Nutrients	عناصر غذائية
Sunlight	ضوء الشمس	Part (structure)	جزء	Stem	ساق
Survive	ينجو	Transport	ينقل	Flower	زهرة
Basic needs	احتياجات أساسية	Plant	نبات	Function	وظيفة
Roots	جذور	Materials	مواد	Absorb	يمتص
Leaves	أوراق	Grow	ينمو	Soil	تربة

Activity (2)

Glucose sugar	سكر الجلوكوز	Seedling	شتلة	Natural resources	مصادر طبيعية
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Activity (3)

Photosynthesis	البناء الضوئي	Shelter	مأوى		
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Lesson (2)

Activity (4)

Germination	عملية الإنبات	Basic	أساسية	Rate	معدل
Plate	طبق	Paper towel	منديل	Growth	نمو
Initial growth	مراحل النمو الأولى	Wet	مبتل		

Activity (5)

Grow healthy	ينمو بصحة جيدة	Strong	قوي	Pale	شاحب اللون
Dark	غامق اللون	Grow unhealthy	ينمو بصحة غير جيدة	Weak	ضعيف

Lesson (3)

Activity (6)

Fix (Anchor)	يثبت	Stomata	الثغور	Tuber stem	الدرنات
Root hairs	شعيرات جذرية	Phloem	أوعية اللحاء	Narrow	ضيق
Vessels	أوعية (أنابيب)	Starch	نشأ	Flat	مسطحة
Wood stem	ساق خشبية	Protein	بروتين	Chlorophyll	كلوروفيل

Interactions of Organisms

Climb stem	ساق متسلقة	Absorb (draw)	يمتص	Capture	يتمص
Runner stem	ساق مدادة	Support	يدعم	Release	ينتج
Needles	إبر	Xylem	أوعية الخشب	Fats	دهون
Wide	عريض	Upright stem	ساق رأسية	Cells	خلايا

Activity (7)

Celery stalk	ساق الكرفس	Food coloring	ألوان الطعام	Hand lens	عدسة يد مكبرة
Tiny	صغير				

Lesson (4)

Activities (8 & 9)

Energy	طاقة	Two atria	بطيئان	Blood vessels	أوعية دموية
Obtain	يحصل على	Pumps	يضخ	Veins	أوردة
Blood stream	مجرى الدم	Organs	أعضاء	Chambers	غرف
Human circulatory system	الجهاز الدوري للإنسان	Gases	الغازات	Two ventricles	أذنيان
Heart	القلب	Digestive system	الجهاز الهضمي	Receive	يستقبل
Arteries	الشرايين	Lungs	الرئتان	Skin	جلد
Blood capillaries	شعيرات دموية	Plant transport system	جهاز النقل في النبات		

Activity (10)

Reproduction	تكاثر	Reproductive parts	أجزاء التكاثر	Grass	عشب
Size	حجم	Shape	شكل	Sunflower	زهرة عباد الشمس
Suitable temperature	درجة حرارة مناسبة	Job (Function)	وظيفة		

Lesson (5)

Activities (11 & 12)

Seed dispersal	انتشار البذور	Stool	براز	Fluffy	رقيفة
Light	خفيف	Maple seeds	بذور القيقب	Dandelion seeds	بذور الهندباء
Float	يطفو	Burdock seeds	بذور الأرقطيون	Competition	منافسة
Spines	أشواك	Transportation	نقل	Coconut seeds	بذور جوز الهند

Lesson

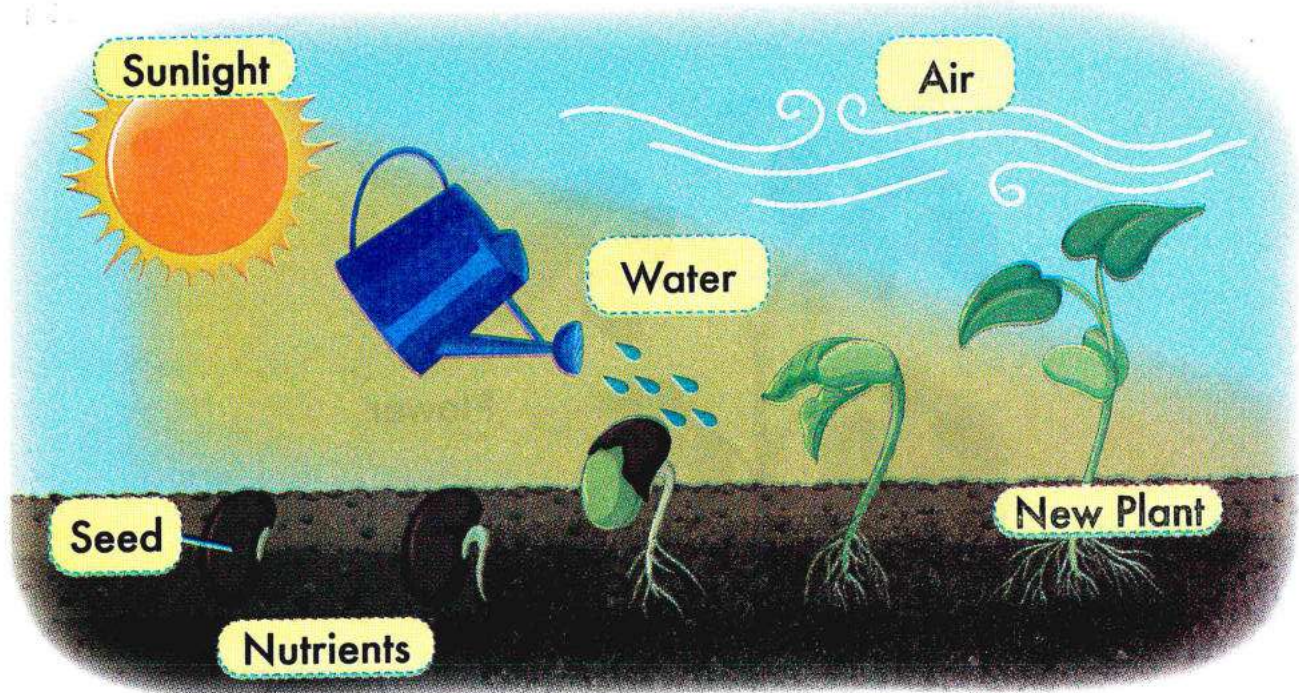
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Activity 1 Can You Explain?

Have you ever planted a seed and watched it grow?
Think about what the plant needs to grow and survive.

Plant Needs

Concept 1



» Plants are living organisms that need some materials to survive; these materials are called “**basic needs**”.

• النباتات كائنات حية تحتاج إلى بعض المواد للبقاء على قيد الحياة، وتُسمى هذه المواد «الاحتياجات الأساسية».

Basic Needs of Plants

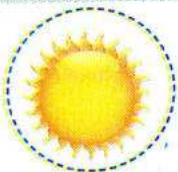
Sunlight

Air

Water

Nutrients

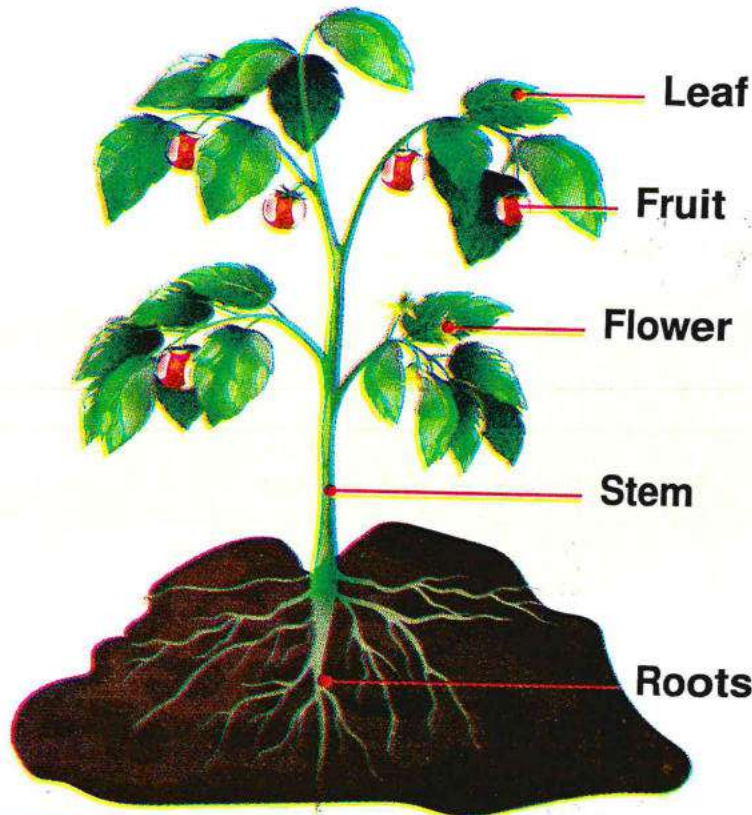
Space to Grow



How do the structures of a plant help it survive?

- A plant consists of **roots**, **stems**, **leaves**, and sometimes **flowers** or **fruits**.
- Each part (structure) of a plant has its own function.
- All parts of a plant help it to get its basic needs to grow healthy and survive.

- يتكوّن النبات من جذور وسيقان وأوراق وأحياناً أزهار أو ثمار.
- كل جزء من أجزاء النبات له وظيفته الخاصة.
- جميع أجزاء النبات تساعد على الحصول على احتياجاته الأساسية التي تمكنه من النمو بشكل صحي والبقاء على قيد الحياة.



- Roots **absorb** water and nutrients from the soil.
- The stem **transports** water and nutrients from the roots to the leaves.
- Leaves **make the plant food** (glucose sugar), which provides the plant with the energy needed to grow and survive.

- تقوم الجذور بامتصاص الماء والعناصر الغذائية من التربة.
- يقوم الساق بنقل الماء والعناصر الغذائية من الجذور إلى الأوراق.
- تقوم الأوراق بصنع غذاء النبات (سكر الجلوكوز) الذي يزود النبات بالطاقة اللازمة للنمو والبقاء على قيد الحياة.

Activity 2 Tree Needs

Think about what living organisms need to survive.

Humans

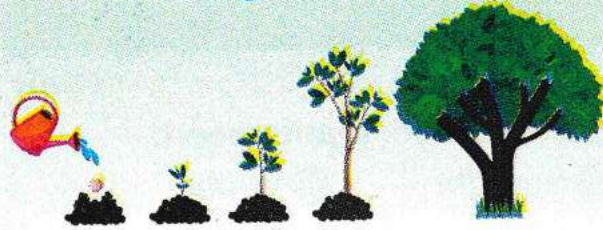
- » Our bodies need food and water every day to **grow healthy** and **survive**.



• يحتاج جسم الإنسان إلى الماء والغذاء يوميًا؛ لينمو بشكل صحي ويبقى على قيد الحياة.

Plants

- » Plants use **natural resources**, such as sunlight, water, and air to make their own food.
- » When we plant a tree, it begins to grow from a **seedling** into a **mature tree**.



• النباتات تستخدم الموارد الطبيعية مثل: ضوء الشمس والماء والهواء؛ لتصنيع غذائها.

• عندما نقوم بزراعة شجرة، نلاحظ بمرور الوقت أنها تنمو وتتحول من شتلة إلى شجرة كبيرة.

Concept 1

Check your understanding?

» Circle the items that a plant needs to grow healthy:



Water



Moonlight



Air



Sandwich



Fire



Sunlight



Juice



T-shirt

Activity 3 What Do You Already Know About Plant Needs?

» All living organisms have **basic needs** to survive.

Plants



Humans and Animals



Their needs

» To survive, plants need:

- 1 Sunlight
- 2 Water
- 3 Air (carbon dioxide to make its own food)
- 4 Nutrients

» To survive, animals need:

- 1 Food
- 2 Water
- 3 Air (oxygen gas to breathe)
- 4 Shelter

How they get their food

» Plants can make their own food (sugar) in their **leaves** through the **photosynthesis process**.

» Humans and animals need to eat food to get nutrients and energy to grow and survive.



NOTE:

• **Water** and **air** are basic needs for all living organisms.



Check your understanding?

» Classify the following words in the table below:

Carbon dioxide – Sugar – Oxygen – Water – Sunlight – Soil

Basic Plant Needs for Photosynthesis

Not Basic Plant Needs for Photosynthesis

Pony Exercises on Lesson One

Answered

1 Choose the correct answer:

1. Plants make their own food by a process known as (Helwan 2024)
☐ (a) respiration ☐ (b) absorption
☐ (c) photosynthesis ☐ (d) digestion
2.  The of plants absorb water and nutrients from the soil.
☐ (a) leaves ☐ (b) stems ☐ (c) roots ☐ (d) flowers
(Cairo 2024 – Dakahlia 2023)
3.  Plants use gas during the photosynthesis process.
☐ (a) nitrogen ☐ (b) oxygen
☐ (c) carbon dioxide ☐ (d) sugar
(Alex. 2024 – Giza 2023)
4.  Green plants can make their own food in their
☐ (a) roots ☐ (b) leaves
☐ (c) stems ☐ (d) flowers
(Cairo 2024 – Beni Suf 2023)
5. Plants need and, which help them make photosynthesis.
☐ (a) sunlight – oxygen ☐ (b) sunlight – carbon dioxide
☐ (c) oxygen – nutrients ☐ (d) oxygen – water
(Cairo 2023)
6. Plants use the energy of to produce their food.
☐ (a) the moon ☐ (b) the wind
☐ (c) the batteries ☐ (d) the sun
(Qalyubia 2023)
7.  The deliver(s) water and nutrients from the roots to the plant leaves.
☐ (a) flowers ☐ (b) seeds ☐ (c) stem ☐ (d) fruits
8. All the following are from the basic needs for a plant to make its own food, except
☐ (a) carbon dioxide ☐ (b) water ☐ (c) sunlight ☐ (d) oxygen
9. Plants take from the air to make their own food. (Alex. 2024)
☐ (a) nutrients ☐ (b) oxygen ☐ (c) sugar ☐ (d) carbon dioxide
10.  During photosynthesis, a plant produces, which gives it the needed energy to grow healthy.
☐ (a) oxygen ☐ (b) sugar ☐ (c) seeds ☐ (d) carbon dioxide

2 Put (✓) or (X):

1. All living organisms need water and air to survive. ()
2.  Plants make their own food through the respiration process. ()
3. Unlike plants, animals can't make their own food. ()
4. Carbon dioxide gas is one of the plants' needs that helps them survive. ()
5. Plants need water and air only to grow. (Dakahlia 2024) ()
6. Plants' food is a type of sugar that is made by their leaves. (Menofia 2023) ()
7. The stem carries water and nutrients from the soil to the plant's leaves. ()
8. Photosynthesis process takes place in the plants' roots. (Cairo 2024) ()
9. Plants make their own food through the photosynthesis process. (Qalyubia 2023) ()
10.  The plant uses natural resources to grow and survive. ()
11. The plant absorbs water from the soil through its roots. ()

3 Correct the underlined words:

1. Leaves help plants get water from the soil. (Alex. 2023) (.....)
2. Roots, soil, and leaves are the main parts of the plant. (.....)
3. Photosynthesis process occurs in the roots of a plant. (.....)
4. Plants absorb water and sunlight from the soil through their roots. (.....)

4 Write the scientific term for each of the following:

1. A vital process through which plants can make their own food. (.....)
2. A part of the plant that carries water and nutrients from the roots to the leaves. (.....)
3. A part of the plant that absorbs water and nutrients from the soil. (.....)
4. A part of the plant that is responsible for manufacturing its food through the photosynthesis process. (Cairo 2023 – Gharbia 2024) (.....)

5. The source of energy that a plant needs to make its own food. (.....)
6. A gas that is used in the photosynthesis process.

(Cairo – Gharbia 2024) (.....)

5 Complete the following sentences:

1.,, and ... are the main common parts of plants.
2. Green plants can make their own food through the process. (Alex. 2023)
3.  Plants get water and from the soil through their
(Ismailia 2023)
4. Humans and animals need to eat food to obtain to survive.
5. Both humans and plants need and air to survive.
6. Plants take gas from the air to make its own food.
7. The stem carries water and nutrients from the to the
of the plant. (Luxor 2023)

6 Cross out the odd word:

1. Roots – Stem – Leaves – Sunlight (Cairo 2024) (.....)
2. Water – Sunlight – Oxygen – Carbon dioxide (Giza 2023) (.....)

7 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. Sugar	Ⓐ is the gas that plants need to carry out the photosynthesis process.
2. Water and nutrients	Ⓑ is considered the plant's food.
3. Carbon dioxide	Ⓒ are responsible for carrying out the photosynthesis process.
4. Plants' leaves	Ⓓ are absorbed by plants' roots from the soil.

1.
2.
3.
4.

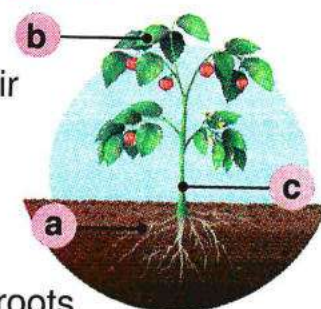
8 Classify the following words in the table below:

Oxygen gas – Carbon dioxide gas – Sugar – Sunlight – Water

Basic plant needs to make its own food	Not basic plant needs to make its own food

9 Look at the following figure, then choose the correct answer:

- Part (a) is responsible for
 - absorbing water and carbon dioxide gas from the air
 - absorbing water and nutrients from the air
 - absorbing water and nutrients from the soil
- Part (c) is responsible for
 - carrying water and nutrients from the leaves to the roots
 - carrying water and nutrients from the roots to the leaves
 - absorbing water and nutrients from the soil
- In the absence of sunlight, can't make the plant's food.
 - part (a)
 - part (b)
 - parts (c)



10 Give a reason for:

- Food is very important for humans.

(Alex. 2024)

- Photosynthesis process is important for plants to survive.

(Cairo 2023)

11 What happens if:

- A plant does not obtain the needed natural resources?

- The leaves of a plant are removed?

Lesson

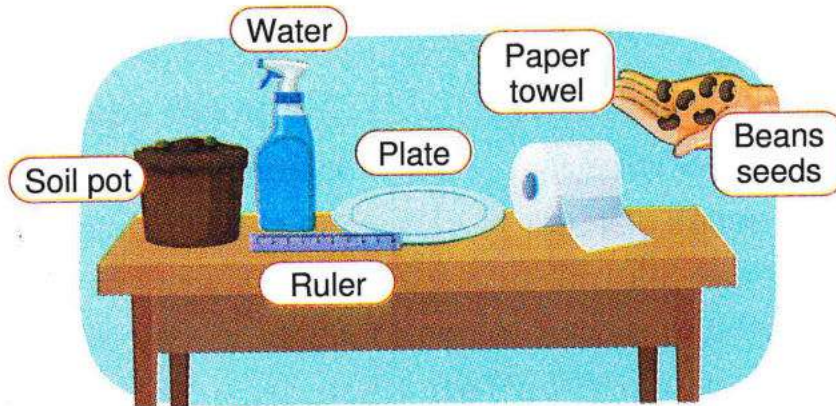
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Plant Needs

Activity 4 Do Plants Need Soil?

» In this experiment, we will **germinate** seeds in the soil and in a wet paper towel to compare their growth.

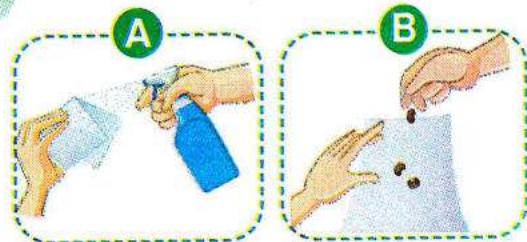
Tools:



Steps:

① Germination of seeds in a paper towel:

- A** Use water to wet the paper towel.
- B** Place three bean seeds on the top half of the **wet paper towel**, and fold the bottom half up to cover the seeds.



② Germination of seeds in the soil:

Plant another three bean seeds in the **soil pot**.



- ③** Place them in a place where they can get **sunlight** and **water** them.



- ④** Check the growth of the seeds using a ruler over the next several days.

Concept 1

Observations:

After one week



- The initial growth of the seeds planted in the paper towel is **similar to** the seeds planted in the soil.

• تتشابه مراحل النمو الأولى للبذور في المنشفة الورقية مع مراحل النمو الأولى للبذور في التربة.

After two weeks



- The growth rate of the seeds grown in the paper towel is **slower than** the seeds planted in the soil.

• البذور المزروعة في المنشفة الورقية تنمو بمعدل أبطأ من البذور المزروعة في التربة.

Conclusion:

- » Seeds can germinate without soil if they obtain **water** and **sunlight**, but finally they need a soil to continue their growth.

• يمكن للبذور أن تنمو بدون تربة لفترة من الوقت إذا كان لديها الماء وضوء الشمس، لكنها في النهاية ستحتاج إلى التربة لتستكمل نموها.

Germination

It is a process in which the plant sprouts and begins to grow from a seed.

عملية الإنبات: هو العملية التي ينبت فيها النبات ويبدأ في النمو من البذرة.

Check your understanding?

» Put (✓) or (x):

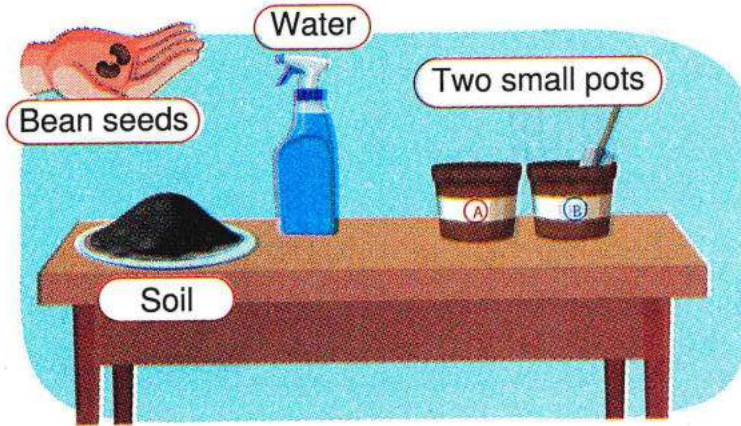
- 1 A seed germinates if it is planted in a dry towel. ()
- 2 All seeds need soil in their initial growth. ()

Activity 5 Sunlight: A Basic Need

» In this experiment, you will study the effect of **sunlight** on plant growth.

• في هذا النشاط، ستقوم بدراسة تأثير ضوء الشمس على نمو النبات.

Tools:



Steps:

① Add soil to the two pots, then label them "A" and "B".

② Place one bean seed in the soil of each pot and cover it with 2 centimeters of soil.

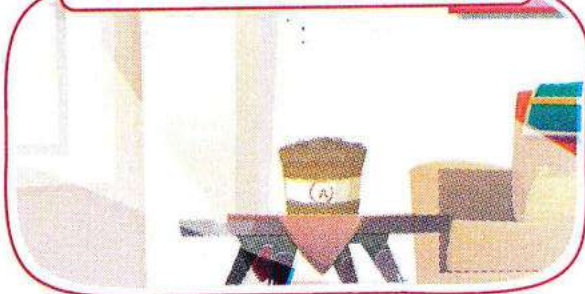


③ Pour the same amount of water into each pot to moisten the soil.

④ Place **pot "A"** where it receives light, and place **pot "B"** in a dark room.

⑤ Water both plants regularly and observe their growth for several days.

Plant "A" receives sunlight.



Plant "B" is in a dark room.



Observations: (After two weeks)

Plant in Pot "A"	Plant in Pot "B"
Placed in the sunlight	Placed in the darkness
It grows healthy.	It grows unhealthy.
It has:	It has:
 - more number of green leaves. - a taller stem.	 - less number of pale green leaves. - a shorter stem.

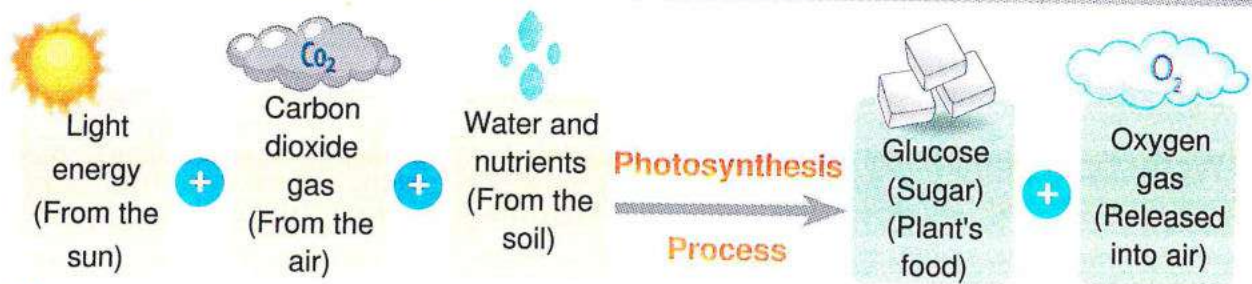
Conclusions:

» Sunlight is considered a basic need for a plant to survive. **GR**

Because the plant uses the sunlight to make its own food.

» Inside the plant's leaves, sunlight allows carbon dioxide to combine with water to produce:

- **Oxygen gas** that is released into the air and is used by humans and animals in the respiration process.
- **Glucose sugar** that gives the plant the needed energy to grow healthy.



Check your understanding?

» Put (✓) or (X):

- 1 Without sunlight, a plant can't grow well. ()
- 2 Sunlight is a basic need for plants to make their own food. ()

Lesson Two

Answered

1 Choose the correct answer:

1. is the process by which a plant starts to sprout and begins to grow from a seed.

(a) Photosynthesis	(b) Respiration
(c) Germination	(d) Transpiration
2. A seed cannot germinate without

(a) water	(b) sunlight	(c) soil	(d) (a) and (b)
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3. Seeds can't grow if they are placed in

(a) the soil	(b) a wet paper towel
(c) a wet cotton ball	(d) a dry paper towel
4. The plant produces through the photosynthesis process, which gives it the energy to grow. (Menofia 2024)

(a) oxygen gas	(b) water
(c) carbon dioxide gas	(d) sugar
5. The gas produced from the photosynthesis process is gas. (Menofia 2023)

(a) carbon dioxide	(b) hydrogen
(c) nitrogen	(d) oxygen
6. During the photosynthesis process, the green leaves take from the air to make their own food. (Alex. 2023)

(a) oxygen gas	(b) sunlight
(c) carbon dioxide gas	(d) water
7. In photosynthesis, sunlight allows and to combine and make sugar.

(a) oxygen – water	(b) water – carbon dioxide
(c) carbon dioxide – oxygen	(d) oxygen – nitrogen

2 Put (✓) or (X):

1. A green plant can grow well if it is placed in a dark room for many days. (Giza 2023) ()
2. Plants' stems absorb oxygen gas from the air. (Damietta 2023) ()
3. The soil is not a basic need for plants. (Cairo 2023) ()
4. A seed could germinate in the absence of water and soil. ()
5. A seed in a wet paper towel grows at a faster rate than in the soil. ()
6. All seeds need water and soil in their initial growth. ()
7. At night, plants use moonlight to make photosynthesis. ()
8. Sunlight is very necessary for a plant to survive. ()

3 Correct the underlined words:

1. A seed could germinate in a dry paper towel. (.....)
2. Plants obtain the needed nutrients and water from the air. (.....)
3. Oxygen gas is absorbed by plants' leaves to make the photosynthesis process. (Beni Suef 2023) (.....)
4. Carbon dioxide gas is produced from the photosynthesis process and helps us breathe. (.....)
5. Plant roots absorb sunlight and carbon dioxide gas from the air. (.....)

4 Write the scientific term:

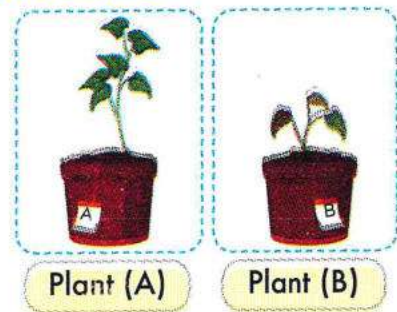
1. The process by which the plant makes its own food by using sunlight. (.....)
2. The gas produced by the photosynthesis process. (Damietta 2023) (.....)
3. The process in which a plant sprouts and begins to grow from a seed. (.....)

5 Complete the following sentences:

1. In the initial growth of a seed, it needs water and _____, but it can germinate in the absence of the _____.
2. Plants produce _____ and _____ during photosynthesis. (Cairo 2023)
3. A growing seed in a wet paper towel needs to be transferred to a _____ after a while to complete its growth.
4. In photosynthesis process, plants use _____ gas and release _____ gas.
5. The photosynthesis process happens in the plant's _____. (Giza 2023)
6. _____ is one of the products of the _____ process, which supplies the plant with the needed energy.
7. When a plant can't make photosynthesis process, its leaves become _____.
8. In green plants, sunlight allows carbon dioxide gas to combine with _____, which is absorbed from the soil by the plant's _____. (Behira 2023)

6 Look at the following figures, then choose the correct answer:

1. Plant _____ (A – B) is placed in a dark room, so it grows in a _____ (faster – slower) rate than plant _____. (A – B)
2. If the seed of plant (B) is placed on a wet paper towel, it _____. (dies – germinates)

**7 Give a reason for:**

1. The leaves of plants have an important role in photosynthesis.
.....
2. Plants need sunlight to survive.
.....

8 What happens if:

1. We put a seed of bean in wet soil for many days? (Giza 2023)
.....
2. A plant is placed in a dark place for many days? (Cairo 2023)
.....

Lesson

3

Activity 6 Parts of a Plant

- » All plants have similar parts, even if they look different.
- » Each part of the plant has a specific **function**.

تحتوي النباتات على أجزاء متشابهة رغم اختلافها في الشكل.
يقوم كل جزء من النبات بوظيفة معينة.

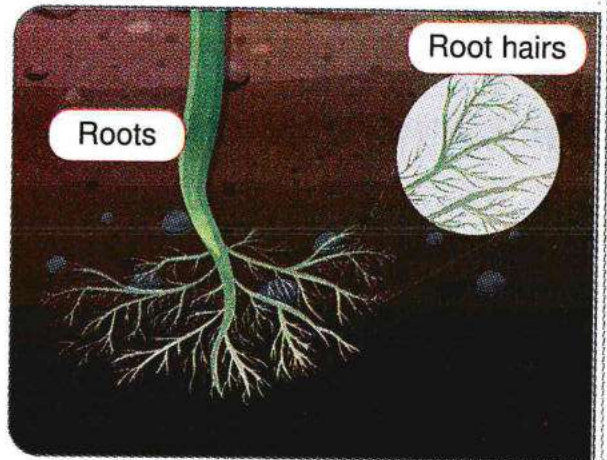
1 Plant's roots

Plant's roots functions:

- 1 They **fix (anchor)** the plant in the soil.
- 2 They **absorb (draw)** water and nutrients from the soil and carry them to the plant to make the plant's food.

وظيفة الجذور:

- 1 تثبيت النبات في التربة.
- 2 مسئولة عن امتصاص الماء والعناصر الغذائية اللازمة من التربة ونقلها للنبات لصنع الغذاء.



- » Plant roots have hair-like structures called "**root hairs**".

Root hairs function:

- » They increase the amount of water and nutrients that the plant can take in from the soil.

توجد بالجذور زوائد تشبه الشعر تسمى الشعيرات الجذرية.
وظيفتها: تزيد من كمية الماء والعناصر الغذائية التي يمتصها النبات من التربة.

2 Plant's stem

Functions:

- 1 It **transports** water and nutrients from the roots to the rest of the plant through small tubes called **xylem**.
- 2 It **supports** the leaves and flowers of the plant.

1 يقوم الساق بنقل الماء والعناصر الغذائية من الجذور لأجزاء النبات الأخرى من خلال أنابيب صغيرة تُسمى «أوعية الخشب».

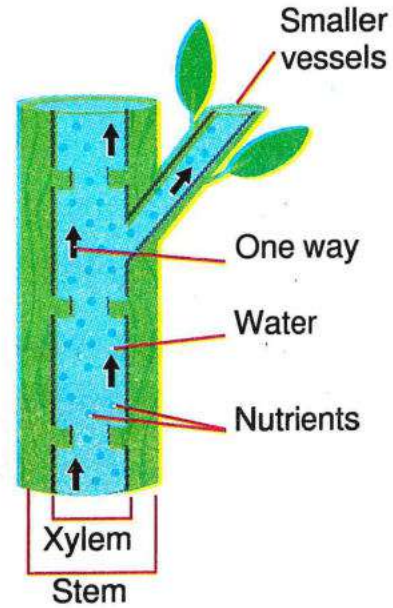
2 يقوم الساق بتدعيم الأوراق والزهور.

Xylem vessels

They are small vessels inside the plant's stem that transport **water** and **nutrients** up from the **roots** to the **leaves**.

أوعية الخشب:

هي أنابيب صغيرة في الساق تقوم بنقل الماء والعناصر الغذائية لأعلى من الجذور للأوراق.



Water and nutrients reach the leaves with the help of:

- 1 The plant's roots.
- 2 The xylem in the stem.
- 3 Smaller vessels of xylem that connect the stem to the leaves.

يسهل الماء والعناصر الغذائية إلى الأوراق بمساعدة:

- 1 جذور النبات.
- 2 أوعية، أخشب في الساق.
- 3 أنابيب صغيرة من أوعية الخشب مهمتها ربط الساق بالأوراق.

Forms of Stems

1 Wood stem

Such as **tree trunks and shrubs**



ساق خشبية: مثل جذوع الأشجار والشجيرات.

2 Upright stem

Such as **most flowers**



ساق رأسية مستقيمة: مثل سيقان أغلب الأزهار.

3 Climb stem

Such as **vine (grapes)**



ساق متسلقة: مثل العنب.

4 Tuber stem

(Extend underground)

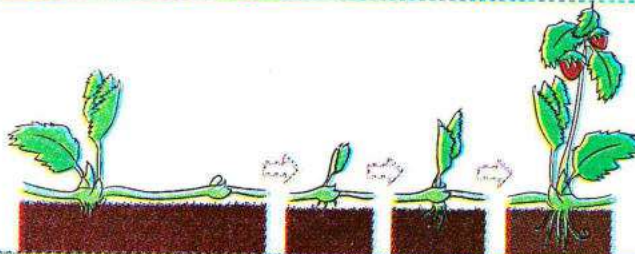
Such as **potato plant**



الدرنات (ساق تمتد تحت الأرض): مثل البطاطس.

5 Runner stem

Some stems run along the ground and help to form new plants.
Such as **strawberry**

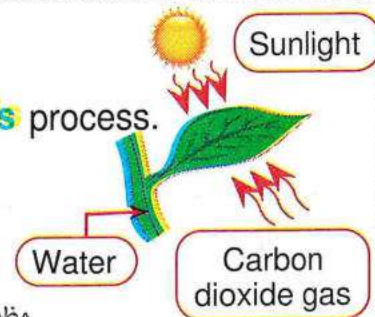


ساق مدادة: هي ساق تمتد على الأرض، وتساعد في تكوين نباتات جديدة مثل ساق نبات الفراولة

3 Plant's leaves

Function:

- They make the **plant's food** through the **photosynthesis** process.
- The leaves need **water**, **carbon dioxide gas**, and **sunlight** to make the plant's food (glucose).



وظيفة أوراق النبات: صنع الغذاء من خلال عملية البناء الضوئي.

• لكي تقوم بتلك العملية، فإنها تحتاج إلى الماء وغاز ثاني أكسيد الكربون وضوء الشمس.

Concept 1

Types of Leaves

- 1 Narrow leaves
(Look like needles)
Such as pine trees



• أوراق صغيرة تشبه الإبر كأوراق شجرة الصنوبر.

- 2 Flat and wide leaves
Such as banana trees



• أوراق مسطحة وعريضة كأوراق شجرة الموز.

The leaves contain:

Chlorophyll

- » Chlorophyll gives the leaves their green color.
- » Chlorophyll captures (absorbs) the light energy from the sun.

• يعطي الأوراق لونها الأخضر. • يمتص الطاقة الضوئية من أشعة الشمس.

Stomata

- » They are pores (tiny openings) on the surface of a plant's leaves that allow gases to move into and out of the plant.



• الثغور: هي فتحات صغيرة موجودة في الأوراق تسمح بمرور الغازات إلى داخل وخارج النبات.

Photosynthesis process

It is the process through which the plant makes its own food inside its leaves by using the light energy from the sun.



– Life on Earth without plants would be impossible. **GR**

Because during photosynthesis, plants produce oxygen gas that animals and humans need to breathe.

Products of Photosynthesis Process

1 Nutrients (food materials)

(such as sugars, starches, fats, and proteins) that the plant needs to live.

2 Oxygen gas that humans and animals need to breathe.

Importance of Photosynthesis Process

1 It helps the plant produce glucose which is used by the plant cells as a source of energy to live and grow.

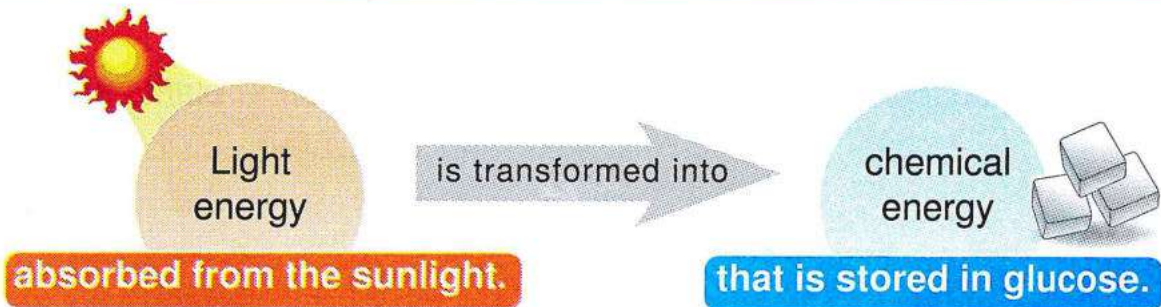
2 It releases oxygen gas that humans and animals need to breathe.

• أهمية عملية البناء الضوئي:

1 تساعد النباتات على إنتاج الجلوكوز، وتقوم خلايا النبات باستخدام الجلوكوز كمصدر للطاقة؛ لتنمو وتظل على قيد الحياة.

2 تُنتج غاز الأكسجين الذي يحتاجه الإنسان والحيوان لعملية التنفس.

Energy Transformation in the Photosynthesis



Check your understanding?

» Put (✓) or (x):

- 1 Planis make their own food by the photosynthesis process. ()
- 2 The phloem transports glucose from the leaves to the other parts of the plant. ()

How does the photosynthesis process occur?



Chlorophyll captures the light energy from the sun.

Stomata allow air to enter the leaves.

Xylem transports water and nutrients up to the leaves.

• تسمح الثغور في الأوراق للهواء بالمرور إلى النبات.

• يقوم الكلوروفيل بامتصاص الطاقة الضوئية من الشمس.

• تقوم أوعية الخشب بنقل الماء والعناصر الغذائية إلى الأوراق.

» In the plant leaves, **water** combines with **carbon dioxide gas** in the presence of **sunlight** to produce **glucose**.

• داخل أوراق النبات، يتحد الماء مع غاز ثاني أكسيد الكربون أثناء وجود أشعة الشمس لإنتاج الجلوكوز.



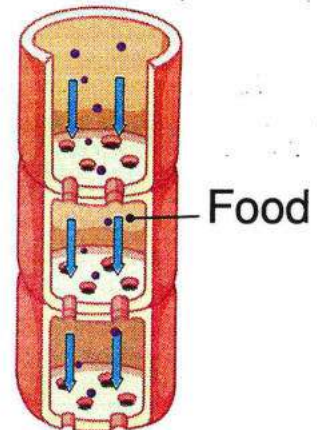
» **Phloem** transports **glucose** from the leaves to the other plant parts.

• تقوم أوعية اللحاء بنقل الجلوكوز من الأوراق لجميع أجزاء النبات.

Phloem

It is a set of tubes (vessels) that transport the food from the leaves to other parts of the plant.

أوعية اللحاء: أنابيب مسئولة عن نقل الغذاء من الأوراق إلى أجزاء النبات الأخرى.



» During photosynthesis process, the plant releases **oxygen gas** and **water vapor** into the air.

• أثناء عملية البناء الضوئي، ينتج النبات غاز الأكسجين وبخار الماء في الهواء.

Activity 7 Up the Stem

Concept 1

» In this experiment, you will study how water and nutrients transfer from the roots to the leaves and flowers through the xylem vessels.

• في هذا النشاط، سوف تتعلم كيفية انتقال الماء والعناصر الغذائية من الجذور للأوراق والزهور من خلال أوعية الخشب.

Tools:



Celery stalk



Glass cup containing water



Scissors



Food coloring



Hand lens

Steps:



1 Add some drops of food coloring to the water in the glass cup.



2 Cut about 2 cm off the bottom of the celery stalk using the scissors.

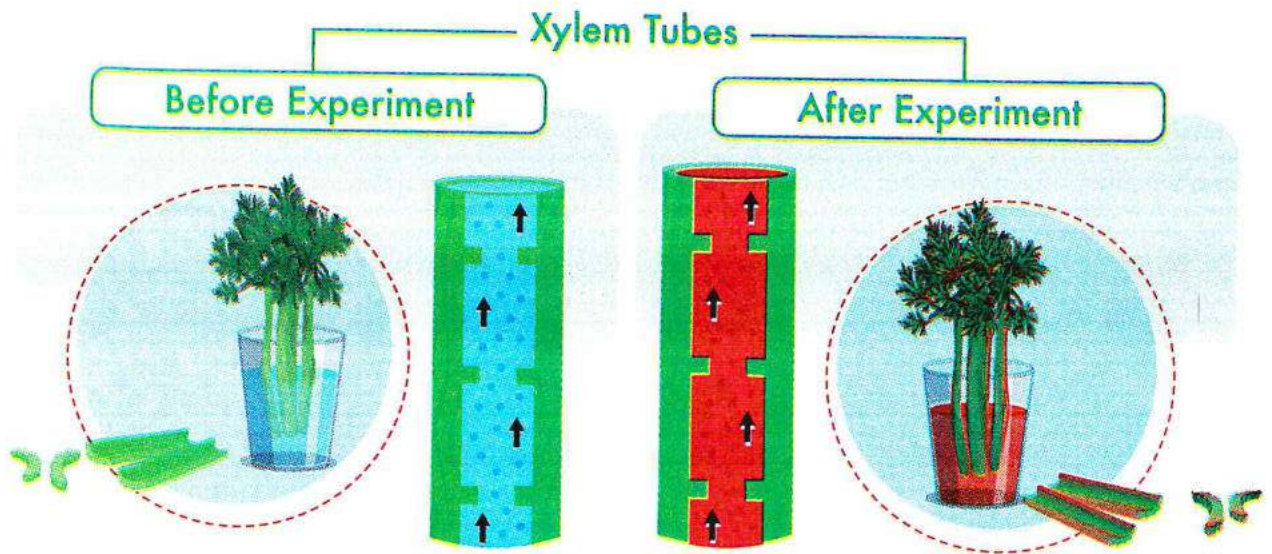


3 Leave the celery stalk in the glass cup until the next day.



4 Cut about 5 cm up from the bottom and observe the xylem using the hand lens.

Observations:



» The color of the **leaves** and **xylem** of the celery stalk changes to **red**.

• يتغير لون أوراق وأوعية الخشب في ساق الكرفس للون الأحمر.

Conclusion:

» There are tiny vessels that carry **water** and **nutrients** up from the plant's roots to its leaves and flowers through the stem, called **xylem**.

• هناك أوعية (أنابيب) صغيرة جدًا تسمى «أوعية الخشب»، تقوم بنقل المياه والعناصر الغذائية لأعلى، من الجذور للأوراق عبر الساق.

Check your understanding?

» Put (✓) or (x):

- 1 Chlorophyll is responsible for the red color appearing on the white flower. ()
- 2 The red-colored water transfers in one direction only through the stem. ()
- 3 Xylem pushes the red-colored water up against gravity. ()
- 4 The flower can survive and grow healthy. ()



Lesson Three

Answered

1 Choose the correct answer:

1. The main function of the plant's roots is
 (a) carrying the flowers and fruits (b) making the plant's food
 (c) anchoring the plant in the soil (d) absorbing sunlight
2. There are in the plant's roots that help the plant to get more water and nutrients. (Cairo 2024)
 (a) vessels (b) root hairs (c) stomata (d) flowers
3. Water and nutrients are transported from the roots to the leaves through the (Alex. 2023)
 (a) xylem (b) phloem (c) chlorophyll (d) stomata
4. A potato plant has a/an stem. (Cairo 2024 – Ismailia 2023)
 (a) upright (b) climb (c) tuber (d) runner
5. A plant has a climb stem. (Gharbia 2023)
 (a) pine (b) vine (c) potato (d) tomato
6. A pine tree has leaves and a stem.
 (a) flat – runner (b) wide – climb
 (c) narrow – wood (d) flat – climb
7. are pores on the surface of a plant's leaves that allow gases to move into and out of the plant. (Giza – Assiut 2023)
 (a) Chlorophyll (b) Xylem (c) Phloem (d) Stomata
8. Food materials are transported from the leaves to the other parts of the plant through the (Alex. 2023)
 (a) stomata (b) roots (c) phloem (d) xylem
9. All the following substances can reach the plant's leaves, except
 (a) water (b) soil (c) nutrients (d) air

10. Which of the following represents the photosynthesis process?

- (a) Carbon dioxide + sugar + water $\longrightarrow$ Oxygen + sunlight
- (b) Oxygen + sugar + water $\longrightarrow$ Carbon dioxide + sunlight
- (c) Oxygen + sunlight + water $\longrightarrow$ Carbon dioxide + sugar
- (d) Carbon dioxide + sunlight + water $\longrightarrow$ Oxygen + sugar

11. The green plant produces all the following substances through the photosynthesis process, except

- (a) starches
- (b) fats
- (c) sugar
- (d) carbon dioxide gas

2 Put (✓) or (X):

1. The plant is fixed in the soil by the help of its roots. (Cairo 2023) ()
2.  Xylem carries glucose from the leaves to the rest of the plant. (Damietta 2023) ()
3. The xylem is important for plants to transfer water from the plants' roots to the leaves. (Dakahlia 2023) ()
4. Potato plants have stems called tubers. (Cairo 2024) ()
5. The stem of a potato plant grows up above the soil surface. ()
6. Most flowers have climb stems. ()
7. There are smaller xylem vessels that connect the plant's stem to its leaves. ()
8. A plant can't make its own food without chlorophyll. ()
9. Stomata allow gases to move into and out of the plant. (Minia 2023) ()
10. The chlorophyll in a plant's roots absorbs sunlight. (Cairo 2023) ()
11. Phloem transports glucose from the leaves to the other plant parts. (Alex. 2024 – Giza 2023) ()
12. Water and carbon dioxide combine in the plant's stem to produce the plant's food. ()
13. Plants and animals are different in their way of getting their food. ()

3 Correct the underlined words:

- The plant's stem contains tiny holes that allow gases to pass into the plant. (Alex. 2023) (.....)
- Xylem help(s) plants get water from the soil. (Alex. 2023) (.....)
- The runner stem of some plants extends underground. (.....)
- The leaves of a huge tree anchor it in the soil. (.....)
- Stomata allow water to enter the leaves to make the photosynthesis process. (.....)
-  Root hairs decrease the amount of water absorbed by the roots. (.....)
- Vine trees have narrow leaves. (.....)
- Chlorophyll gives the plant its blue color. (.....)

4 Write the scientific term:

- A plant structure that anchors the plant in the soil. (.....)
- They are the structures present in a plant's roots that increase the amount of water and nutrients absorbed from the soil. (.....)
- They are vessels that carry water and nutrients from the plant's roots to its leaves. (.....)
- A type of stem that runs along the ground. (.....)
- A type of stem in a potato plant. (.....)
- A tree that has narrow needle leaves. (.....)
- They are tiny openings on the surface of the plant's leaves that allow gases to move into and out of the plant. (Ismailia 2023) (.....)
- They are found in the plant's leaves that capture sunlight. (.....)
- A type of vessels that carries food from the leaves to all plant parts. (.....)
- A part of the plant where water and carbon dioxide combine during the photosynthesis process. (.....)
- A gas produced from photosynthesis and is necessary for humans' respiration. (.....)

5 Complete the following sentences:

1. Most flowers have stems. [Alex. 2023]
2. The plant's leaves have tiny openings called [Gharbiya 2023]
3. The plant absorbs sunlight energy due to the presence of the
in their leaves. [Alex. 2024]
4. Humans and animals need to breathe.
5. The tubes that carry food from the leaves to all plant parts are called
..... [Cairo 2023]
6. Without the in the leaves of plants, gases can't move into or
out of the plant. [Beni Suef 2023]
7. The photosynthesis process happens in the plant's [Giza 2023]

6 Cross out the odd word:

1. Oxygen gas – Fats – Carbon dioxide gas – Starches (.....)
2. Sugar – Carbon dioxide gas – Water – Sunlight (.....)

7 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. Chlorophyll	Ⓐ carries and supports the plants' leaves and flowers.
2. Stomata	Ⓑ allow gases exchange between the plants' leaves and air.
3. Xylem	Ⓒ gives the plants' leaves their green color.
4. Stem	Ⓓ transports sugar from the plants' leaves to other plants' parts.
5. Phloem	Ⓔ transports water from the plants' roots upward to their leaves.

1. 2. 3. 4. 5.

8 Mention one example for each of the following:

1. A plant that has a climb stem.
2. A plant that has a tuber stem.
3. A tree that has narrow leaves.

9 Mention one function for each of the following:

1. A plant's roots.
2. A plant's leaves.
3. A plant's stem.
4. Xylem.
5. Phloem.
6. Stomata.
7. Chlorophyll.

10 Define the following:

- Photosynthesis process.
-
-

11 Mention the food materials manufactured by the plant's leaves during the photosynthesis process.

.....

.....

.....

12 Study the opposite figure, then complete:

1. The color of the xylem and the leaves of the flower turn into
2. The is responsible for changing the color of the flower.



13 Look at the following figures, then complete:



Figure (1)



Figure (2)



Figure (3)



Figure (4)

1. The plant in figure (1) has a/an stem.
2. The plant in figure (2) has a/an stem.
3. The stem of the plant in figure (3) is called
4. The stem of the plant in figure (4) runs along the ground, so it is called

14 Give a reason for:

1. Xylem vessels are important for the plant. [Giza 2023]
.....
2. Chlorophyll has an important role in the photosynthesis process. [Cairo 2023]
.....
3. Life on Earth without plants would be impossible. [Dakahlia 2024]
.....
4. Root hairs are important for the plant.
.....

15 What happens if:

1. The plants' leaves don't contain chlorophyll? [Damietta 2023]
.....
2. There is no stomata on plants' leaves?
.....
3. A plant can't absorb the needed carbon dioxide gas?
.....

Lesson

4

Plant Needs

Activity 8 Comparing Plant and Human Systems

Concept 1

- » Both plants and humans need **energy** and **gases** to survive and grow, but they differ in the way they obtain them.

يحتاج كل من النبات والإنسان إلى الطاقة والغازات من أجل البقاء والنمو، لكنهما يختلفان في طريقة الحصول عليهما.

1 Getting Energy

Plants

- » Plants can make their own food (**glucose sugar**) in their **leaves** through the **photosynthesis process**.
- » Glucose provides the plant with the needed energy to grow and survive.



Humans

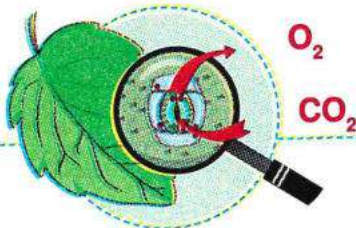
- » Humans must eat food to get energy.
- » The **digestive system** digests food into nutrients and glucose that are absorbed into the **blood stream**.



2 Getting Gases

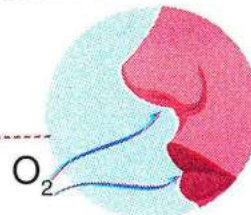
Plants

- » Air enters the plant through the **stomata** in the leaves.



Humans

- » Air enters the human body through our **nose** and **mouth**, and then travels to the **lungs**, where oxygen is absorbed into the blood.



- Now, let's discover how the human circulatory system and plant transport system are similar.

Human Circulatory System

It is the system that transports oxygen and nutrients through blood to all body parts.

الجهاز الدوري في الإنسان:
هو الجهاز الذي يقوم بنقل الأكسجين والعناصر الغذائية خلال الدم لجميع أجزاء الجسم.

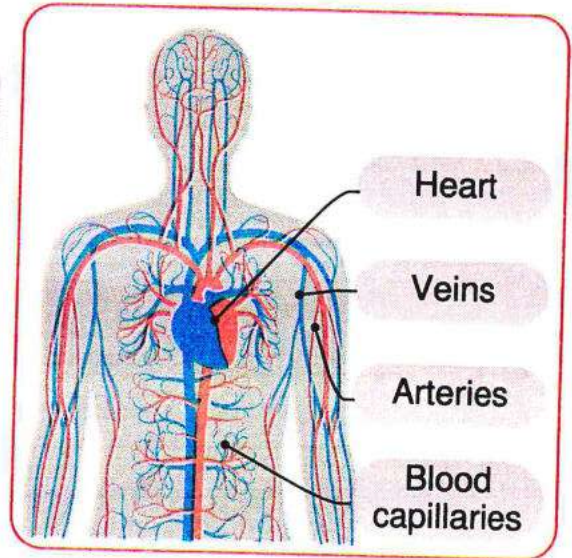
Human circulatory system consists of:

- 1 Heart
- 2 Blood vessels
- 3 Blood

Arteries

Veins

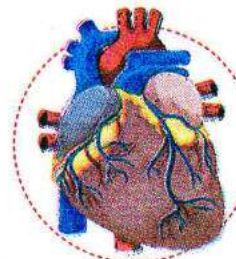
Blood capillaries



1 Heart

- The heart consists of **four chambers**: two **atria** and two **ventricles**.
- The heart **pumps** the blood to all body parts.
- The heart **receives** blood from all body parts.

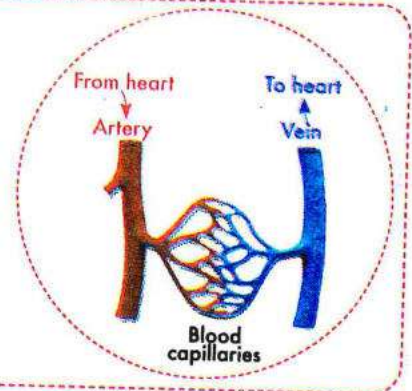
- يحتوي القلب على 4 حجرات (أذينان وبطينان).
- يقوم القلب بضخ الدم لجميع أجزاء الجسم.
- يقوم القلب باستقبال الدم من جميع أجزاء الجسم.



2 Blood vessels

- They are tubes that transport **nutrients** and **gases** throughout the whole body.

الأوعية الدموية:
هي أنابيب مسؤولة عن نقل العناصر الغذائية والغازات خلال الجسم.



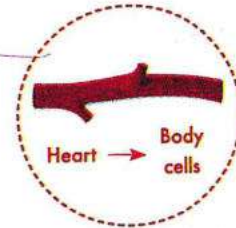
Types of Blood Vessels

- There are three types of blood vessels, which are:

A Arteries

- They carry the blood rich in **oxygen** and **nutrients (glucose)** from the **heart** to **all the body cells**, so the body can survive.

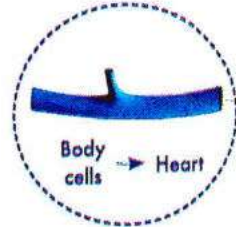
تقوم الشرايين بنقل الدم المحمل بغاز الأكسجين والعناصر الغذائية (الجلوكوز) من القلب إلى جميع خلايا الجسم؛ كي يتمكن الجسم من البقاء على قيد الحياة.



B Veins

- They return the blood that carries **carbon dioxide** and a small amount of oxygen and nutrients from the **body cells** to the **heart**, then to the lungs, where the blood gets rid of carbon dioxide and carries oxygen again.

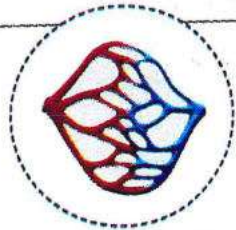
تقوم الأوردة بنقل الدم المحمل بغاز ثاني أكسيد الكربون والقليل من الأكسجين والعناصر الغذائية إلى القلب ثم إلى الرئتين؛ ليتم تزويد الدم بالأكسجين مرة أخرى.



C Blood capillaries

- They are tiny blood vessels that connect arteries to veins.

الشعيرات الدموية: هي أنابيب صغيرة جداً مهمتها ربط الشرايين بالأوردة.



NOTES:

- You can see the **veins** and **arteries** through the skin on your hands or arms.

يمكنك ملاحظة شكل الأوردة والشرايين الموجودة تحت الجلد على يديك أو ذراعيك.

- Blood is the fluid that moves in only **one (direction)** in humans' veins, or arteries, so they are called one-way vessels.

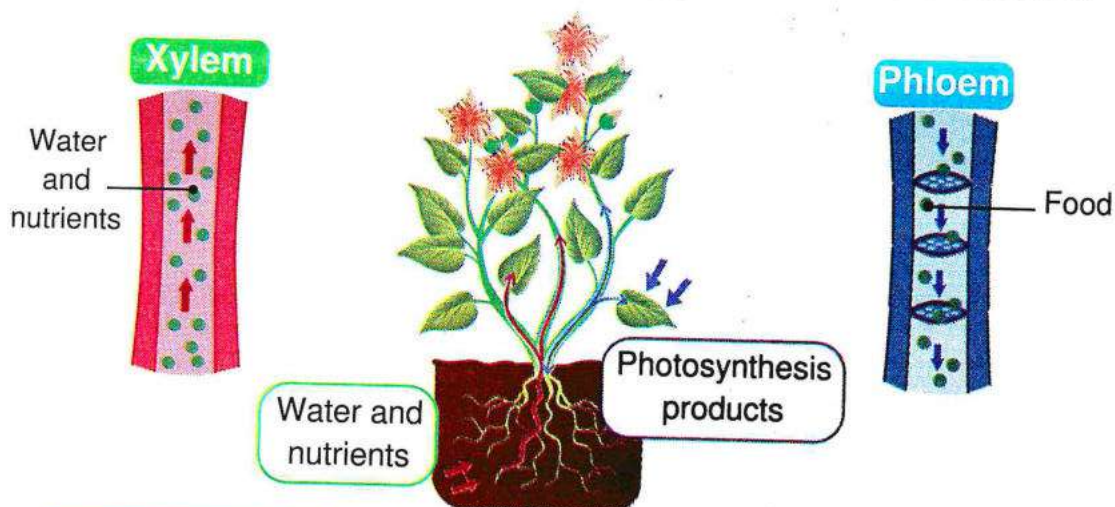
الدم هو سائل يتحرك في اتجاه واحد عبر أوردة الإنسان أو شرايينه ولذلك فهي أنابيب أحادية الاتجاه.



1 Plants Transport System (Plant Vascular System)

It is the system of vessels (tubes) that transport water, nutrients, and the plant's food between the plant parts.

- The plant transport system consists of two types of vessels which are:



Xylem

It consists of small tubes that transport **water** and **nutrients** from the **roots** to the **leaves**.

تقوم أوعية الخشب بنقل الماء والعناصر الغذائية من الجذور للأوراق.

Phloem

It consists of small tubes that transport **glucose** from the **leaves** to **all plant parts**.

تقوم أوعية اللحاء بنقل سكر الجلوكوز من الأوراق لباقي أجزاء النبات.

There are some similarities between the human circulatory system and the plant transport system, such as:

- Both have vessels that transport water, nutrients, and gases.
- Both have one-way vessels.

• يقومان بنقل الماء والعناصر الغذائية والغازات اللازمة إلى جميع أجزاء الجسم. • كلاهما يحتوي على أنابيب أحادية الاتجاه.

Check your understanding?

» Put (✓) or (x):

- Air enters the human body through the lungs. ()
- The xylem, phloem, arteries, and veins are one-way vessels. ()

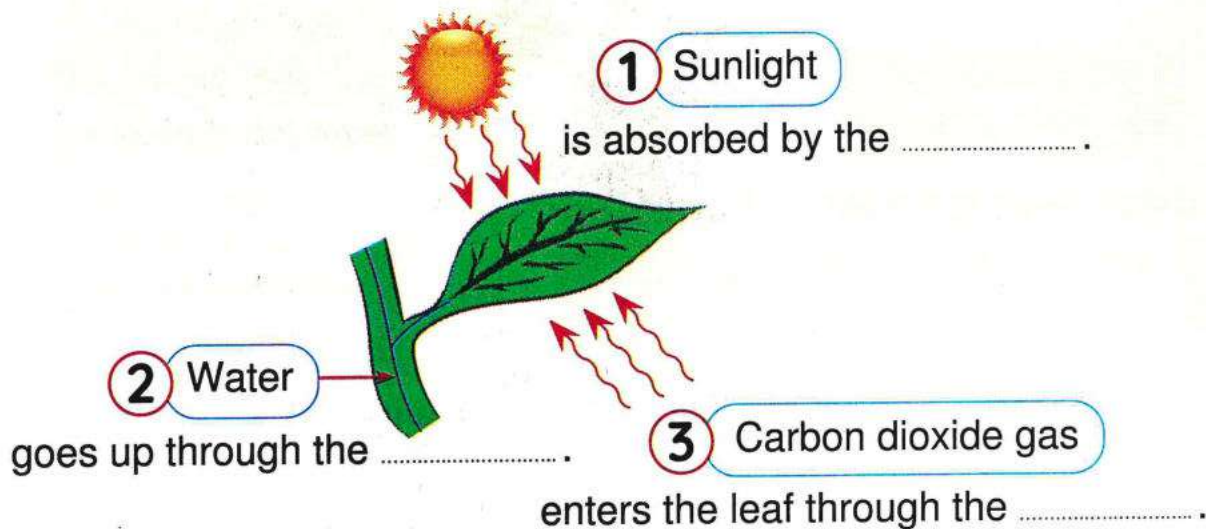
Activity 9 Plant Food

1 Complete the following sentences:

Green leaves use the energy of the to allow to combine with and produce:

- Nutrients, such as sugars,,, and proteins.
- gas and water vapor which are released into the air.

2 Complete the following diagram:



3 Arrange the following steps of the photosynthesis process:

- (.....) Plant parts use the glucose for their needs, such as growth.
- (.....) Phloem moves glucose from the leaves to all plant parts.
- (.....) Chlorophyll absorbs light energy from the sun.
- (.....) The leaves transform the light energy into glucose.

Activity 10 Flowers and Seeds

Unit 1

- Plants use the energy from the food they make to produce **flowers**.
- In many plants, flowers are responsible for **reproduction**.

• تستخدم النباتات الطاقة التي حصلت عليها من الغذاء الذي قامت بصنعه في إنتاج الزهور.
• في العديد من النباتات تكون الأزهار هي المسؤولة عن عملية التكاثر.

Flowers are different in their:

Shape, size, and color.



Flowers are similar in their:

Main job (function):

They help the plant reproduce by producing seeds.

- Flowers are the reproductive parts of many plants.** GR

Because flowers produce seeds, and when the seeds receive **air, water**, and a **suitable temperature**, they grow into a new plant.

• تساعد الأزهار النباتات على التكاثر؛ وذلك لأنها تنتج البذور، وعندما تحصل البذور على الهواء والماء ودرجة الحرارة المناسبة؛ فإنها تؤدي لنمو نبات جديد.



- Some flowers are **colorful**, and the others are **not very colorful**.
- Some flowers are **large**, and the others are **very small** and hardly seen, such as the flowers of **grasses**.

• تكون بعض أزهار النباتات زاهية الألوان، والبعض الآخر ليست زاهية.

• تكون بعض أزهار النباتات كبيرة، والبعض الآخر صغيرة جدًا تصعب رؤيتها مثل أزهار الأعشاب.

Flowers

They are the **reproductive parts** of many plants.

الزهور: هي أجزاء التكاثر في العديد من النباتات.

Plant reproduction

It is the process of making new plants.

التكاثر في النبات: هو عملية إنتاج نباتات جديدة.

Sunflower

- The seeds of sunflower are the small, dark objects in the center of this flower.

• بذور عباد الشمس: هي الأجسام الداكنة الصغيرة الموجودة في وسط الزهرة.



Check your understanding?

» Correct the underlined words:

- 1 The main function of a flower is making the plant food.
(.....)
- 2 Photosynthesis is the process of producing new plants.
(.....)
- 3 The brightly colored parts of many plants are called leaves.
(.....)
- 4 Sunflower seeds are yellow.
(.....)

Lesson Four

Answered

1 Choose the correct answer:

- The system that transports blood in the human body is called the
(Menofia 2024)
 (a) digestive system (b) respiratory system
 (c) circulatory system (d) nervous system
- All the following are from the blood vessels in the human body, except
 (a) arteries (b) blood capillaries
 (c) veins (d) xylem
- Arteries carry blood rich in through the human body.
 (a) oxygen gas only (b) nutrients only
 (c) carbon dioxide gas (d) oxygen gas and nutrients
- In the human body, the pump(s) blood through the to all the body parts.
 (a) heart – xylem (b) lungs – blood vessels
 (c) heart – blood vessels (d) lungs – roots
- Blood rich in carbon dioxide gas returns back to the heart through
 (a) arteries (b) veins (c) lungs (d) xylem (Menoufia 2024)
- carry blood that is rich in oxygen and glucose from the heart to the body cells.
(Dakahlia 2023)
 (a) Veins (b) Lungs (c) Arteries (d) Brains
- The in the leaves allow(s) air to enter the plant.
 (a) roots (b) xylem (c) phloem (d) stomata (Assiut 2023)
- Both xylem and veins are vessels that
(Giza 2023)
 (a) are found in plants (b) carry blood
 (c) are one-way vessels (d) are two-way vessels
- Glucose sugar is transported from the leaves to all parts of the plant through the
(Alex. – Gharbiya – Ismailia 2023)
 (a) chlorophyll (b) stomata (c) xylem (d) phloem

10. In plants' leaves, the light energy of the sun is converted into energy during the photosynthesis process. (Damietta 2023)
 (a) sound (b) electrical (c) chemical (d) kinetic
11. Glucose is a type of produced by plants in the photosynthesis process.
 (a) sugar (b) protein (c) fats (d) starch
12. Flowers produce for reproduction. (Cairo – Alex. 2023)
 (a) leaves (b) stems (c) seeds (d) roots
13. The process of producing a new plant is called the process.
 (a) photosynthesis (b) reproduction (c) respiration (d) digestion

2 Put (✓) or (X):

- Both humans and plants need energy and gases to survive. (Giza 2023) ()
- Food and oxygen provide the body with the needed energy. (Alex. 2023) ()
- The human circulatory system consists of the heart and blood vessels. ()
- The heart consists of two atria and two ventricles. ()
-  Air enters the human body through the lungs. ()
- The veins carry blood rich in oxygen and nutrients. (Cairo 2023 & 2024) ()
- Veins return the blood, which contains carbon dioxide gas, to the heart. (Cairo – Al Azhar 2024) ()
- Arteries carry blood poor in oxygen gas and nutrients. ()
- Blood moves only in one direction in humans' veins or arteries. (Alex. 2023) ()
-  In plants, light energy is converted into chemical energy. ()
- The plant makes glucose sugar during the respiration process. ()
- Plants' seeds are formed inside the flowers. ()
- The xylem transports water and nutrients downward in the plant. ()
- All plants have large and colorful flowers. ()
- The reproductive parts of many plants are flowers. (Dakahlia 2024) ()

3 Correct the underlined words:

- Veins return the blood that carries oxygen gas to the heart. (.....)
- The heart consists of two arteries and two ventricles. (.....)

3. The heart pumps water throughout all the human body parts. (.....)
4. Plants manufacture glucose inside their roots during the photosynthesis process. (.....)
5. A leaf is the reproductive part of the plant. (.....)
6. The flowers of the plant are responsible for producing stems. (.....)

4 Write the scientific term:

1. It is the system inside the human body that includes the heart and blood vessels. (.....)
2. It is an organ that pumps blood throughout the human body. (.....)
3. They are blood vessels that carry blood rich in oxygen gas and nutrients from the heart to all the human body parts. (.....)
4. They are blood vessels that return the blood rich in carbon dioxide gas from all body parts to the heart. (.....)
5. They are vessels in plants through which water and nutrients move up from the roots to the leaves. (Menofia 2024) (.....)
6. It is a type of vessels that carries glucose from the plant's leaves to all the plant parts. (.....)
7. It is a plant system that consists of xylem and phloem tubes. (.....)
8. They are parts of the plant that are responsible for reproduction. (Qalyubia 2023 – Cairo 2024) (.....)
9. It is a part of the plant that is responsible for producing the seeds. (.....)

5 Cross out the odd word:

1. Roots – Leaves – Stems – Veins (Qalyubia 2024) (.....)
2. Heart – Arteries – Phloem – Veins (.....)
3. Flower – Stem – Roots – Blood (.....)

6 Complete the following sentences:

1. Arteries carry blood rich in and from the heart to the body's cells. (Gharbia 2024)
2. The human system transports nutrients and oxygen to the cells and organs in the human body. (Ismailia 2023)
3. The system of the plant allows the transfer of water and nutrients through all the plant parts. (Alex. 2024)
4. return the blood that contains carbon dioxide back to the heart. (Qalyubia 2024)
5. are the reproductive parts of many plants. (Qalyubia 2024)
6. Air enters the human body through and
7. There are three types of vessels in the human circulatory system, which are,, and blood capillaries. (Cairo 2023)
8. carry the blood rich in oxygen and glucose from the heart to the organs. (Alex. – Dakahlia 2024)
9. Arteries and veins are connected by blood vessels called
10. Veins carry blood that contains gas from the body parts to the (Cairo 2023)
11. are small vessels that transport water and nutrients from the plant's to its flowers and
12. In a plant's leaves, the energy of the sun changes into energy. (Menofia 2023)
13. Flowers are the parts of many plants. (Alex. 2023)
14. The of sunflower are small, dark-colored objects in the center of the flower.

7 Write the number that represents each of the following:

1. Types of blood vessels in the human body. (.....)
2. The number of chambers of the heart. (.....)
3. Types of vessels of the plant transport system. (.....)

8 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. Arteries	Ⓐ carry carbon dioxide gas from the body parts to the heart. (Giza 2023)
2. Photosynthesis process	Ⓑ carry oxygen and nutrients from the heart to the body parts. (Helwan 2024)
3. Veins	Ⓒ are tiny blood vessels that connect the arteries to the veins.
4. Phloem	Ⓓ produces oxygen gas, which is important for breathing. (Cairo 2024)
5. Blood capillaries	Ⓔ carries glucose sugar from the leaves to all the plant parts.

1. 2. 3. 4. 5.

9 Classify the following words in the table below:

Xylem – Veins – Blood capillaries – Phloem – Arteries – Heart

Human Circulatory System	Plant Transport System

10 Mention one example for each of the following:

1. A blood vessel.

.....

2. A vessel in the plant transport system.

.....

11 Mention one function for each of the following:

1. The human circulatory system.

2. Arteries.

3. Veins.

4. Blood capillaries.

5. Heart.

6. Flowers.

12 Study the following diagram, then choose the correct answer:

1. The vessel number ① represents the

- ☐ (a) xylem
 ☐ (b) arteries
 ☐ (c) phloem

2. The vessel number ② represents the

- ☐ (a) veins
 ☐ (b) xylem
 ☐ (c) phloem

3. The vessel number ③ carries

- ☐ (a) water
 ☐ (b) blood
 ☐ (c) glucose

13 Look at the following figures, then put (✓) or (x):

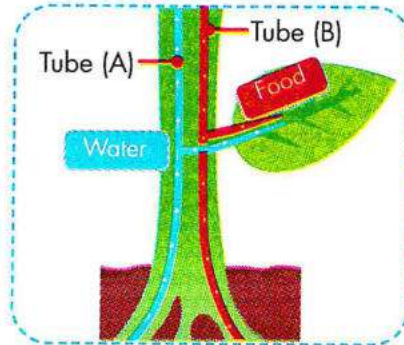


Figure (1)

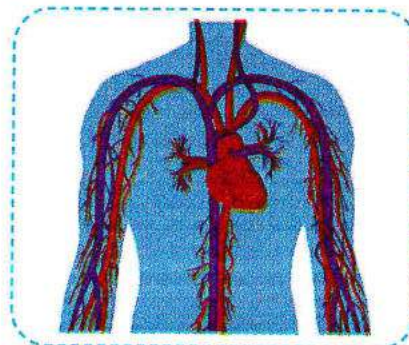


Figure (2)

1. Figure (2) represents the respiratory system in the human body. ()
2. Tube (A) in figure (1) carries glucose to other plant parts. ()
3. Tube (B) in figure (1) represents the xylem vessels. ()
4. The vessels in both figures are one-way vessels. ()
5. In figure (2), the heart receives blood poor in oxygen through the veins. ()

14 Give a reason for:

1. The circulatory system has an important role for humans. [Menofia 2023]
.....
2. Both phloem and arteries are considered one-way vessels.
.....
3. Flowers are very important for the plant's reproduction.
.....

15 What happens if:

1. The plant transport system consists of xylem tubes only?
.....
2. We remove the flowers of a plant? [Menofia 2023]
.....

Lesson

5

Activity 11 Seed Dispersal

Plant Needs

Concept 1

» Tick (✓) in front of the right answer:

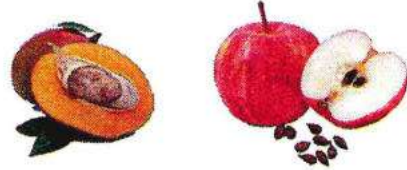
1 The seeds of apricots and apples have
..... shape and size.

☐

the same

☐

different



2 The seeds of kapok trees are transported by the
.....

☐

water

☐

wind



From the previous questions, we can conclude that:

- The seeds of plants are different in **size** and **shape**.
- Seeds are transported from one place to another; this process is called "**seed dispersal**".

• تنتقل بذور النباتات من مكان لآخر عن طريق عملية تُسمى «انتشار البذور».

• تختلف بذور جميع النباتات في الشكل والحجم.

Seed dispersal

It is the transportation of the seeds from one place to another.

- **Seeds need to travel away from the parent plant.** **GR**

To avoid competition for resources like sunlight, water, and nutrients.

يجب أن تستقر البذور بعيدًا عن النبات الأصلي؛ حتى يتجنب النبات الصغير المنافسة على الموارد كضوء الشمس والماء والعناصر الغذائية.

- The way of seeds dispersal depends on the **size** and the **shape** of seeds.

تعتمد طريقة انتشار البذور على شكل وحجم البذور.

Ways of Seed Dispersal

1 Water

- Some seeds can **float** on the water surface, so they are dispersed by water.

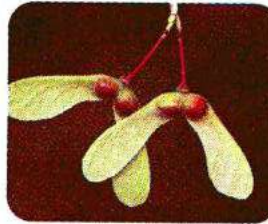


Such as **coconut seed**

بذرة جوز الهند

2 Wind

- Some seeds are **light**, so they are dispersed by wind.



Such as

maple seed

بذرة القيقب

dandelion seeds

بذرة الهندباء

3 Animals or Humans

- Some seeds have **spines**, so they can stick to animals' fur or humans' clothes.

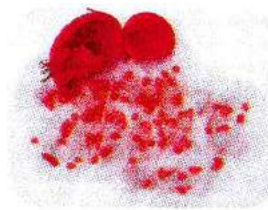


Such as **burdock seeds**

بذور الأرقطيون

4 Eaten by Animals

- Some seeds are dispersed when they come out with animals' stool in another place.



Such as

tomato seeds

بذور الطماطم

apple seeds

بذور التفاح

Check your understanding?

» Put (✓) or (x):

- Coconut seeds can be dispersed by wind. ()
- Tomato seeds can be dispersed by the animal's digestive system. ()

Activity 12 Record Evidence Like a Scientist

» Now that you have learned about plant needs, look again at the image of planting a tree. You first saw this in Wonder.



Concept 1



Question:

How do plant parts make use of water, air, and light for vital processes?



My Claim:



Evidence:



Scientific Explanation with Reasoning:

Lesson Five

Answered

1 Choose the correct answer:

1.  The process of transporting seeds from one place to another is called
 (a) seed germination (b) reproduction
 (c) photosynthesis (d) seed dispersal (Cairo 2023)
2. Maple seeds travel by wind because they are seeds. (Giza 2023)
 (a) light (b) spiny (c) heavy (d) smooth
3. Burdock seeds have to stick to animals' fur.
 (a) leaves (b) spines (c) feathers (d) roots
4. Seeds of and are transported by wind.
 (a) tomato – maple (b) maple – apple
 (c) burdock – dandelion (d) dandelion – maple
5. Seeds of and can be dispersed by animals in two different ways of seed dispersal.
 (a) tomato – apple (b) burdock – apple
 (c) maple – dandelion (d) tomato – maple
6. One of the ways of seed dispersal is by floating on water, such as in seeds. (Suez 2023)
 (a) tomato (b) coconut (c) burdock (d) dandelion

2 Put (✓) or (X):

1. Seeds can be dispersed by wind, water, and sunlight. ()
2. Coconut seeds are dispersed by wind. (Cairo 2024 – Minia 2023) ()
3. Burdock seeds are spiny, so they can stick to animals' fur. (Cairo 2023) ()
4. Coconut seeds are dispersed by water because they are light. (Gharbia 2024) ()
5. Dandelion seeds are light enough to be dispersed by water. ()
6. Both tomato and apple seeds can be dispersed by animals. ()
7. Maple seeds are heavy to be carried by the wind. ()
8. A human can help in transferring the seeds from one place to another. ()
9. Tomato seeds are light, so they could disperse through the air. (Behira 2023) ()

3 Correct the underlined words:

1. Seed germination is the transportation of plants seeds from one place to another. (.....)
2. Burdock seeds are light seeds. (Aswan 2023) (.....)
3. Coconut seeds could sink in water. (.....)
4. Coconut seeds could be dispersed by wind. (Minia 2023) (.....)

4 Write the scientific term:

1. It is a process of transferring plants' seeds from one place to another. (.....)
2. It is a plant whose seeds are dispersed by floating on water. (.....)

5 Complete the following sentences:

1. Coconut seeds are dispersed by as they can float. (Alex. 2024)
2. Traveling by wind and floating on water are two ways of (Dakahlia 2023)
3. Some seeds could be transported from one place to another by floating on water, such as seeds, while other seeds travel by wind, such as seeds. (Qalyubia 2023)
4. One of the ways of seed dispersal is coming out with the of animals, such as seeds.

6 Mention two methods of seed dispersal:

(Gharbiya 2023)

.....

.....

7 Mention the method of seed dispersal of each the following:

1. Dandelion seeds:
2. Coconut seeds:

(Giza 2023)

8 Look at the following figures, then complete the sentences below:



Figure (1)



Figure (2)



Figure (3)



Figure (4)

1. If a dog eats the plant in figure (3), its seeds are dispersed by coming out in the dog's
2. The seeds in figure (.....) are dispersed by floating on
3. The plant in figure (.....) have light seeds to be easily carried by the
4. The seeds in figure (.....) are dispersed by sticking to humans' clothes.

9 Give a reason for:

1. A farmer found seeds that are not from the seeds of his farm. (Cairo 2023)
.....
2. Seeds of dandelion or maple can be dispersed by wind. (Fayoum 2023)
.....
3. A human is considered a way of seed dispersal.
.....
4. Burdock seeds can stick to animals' fur.
.....

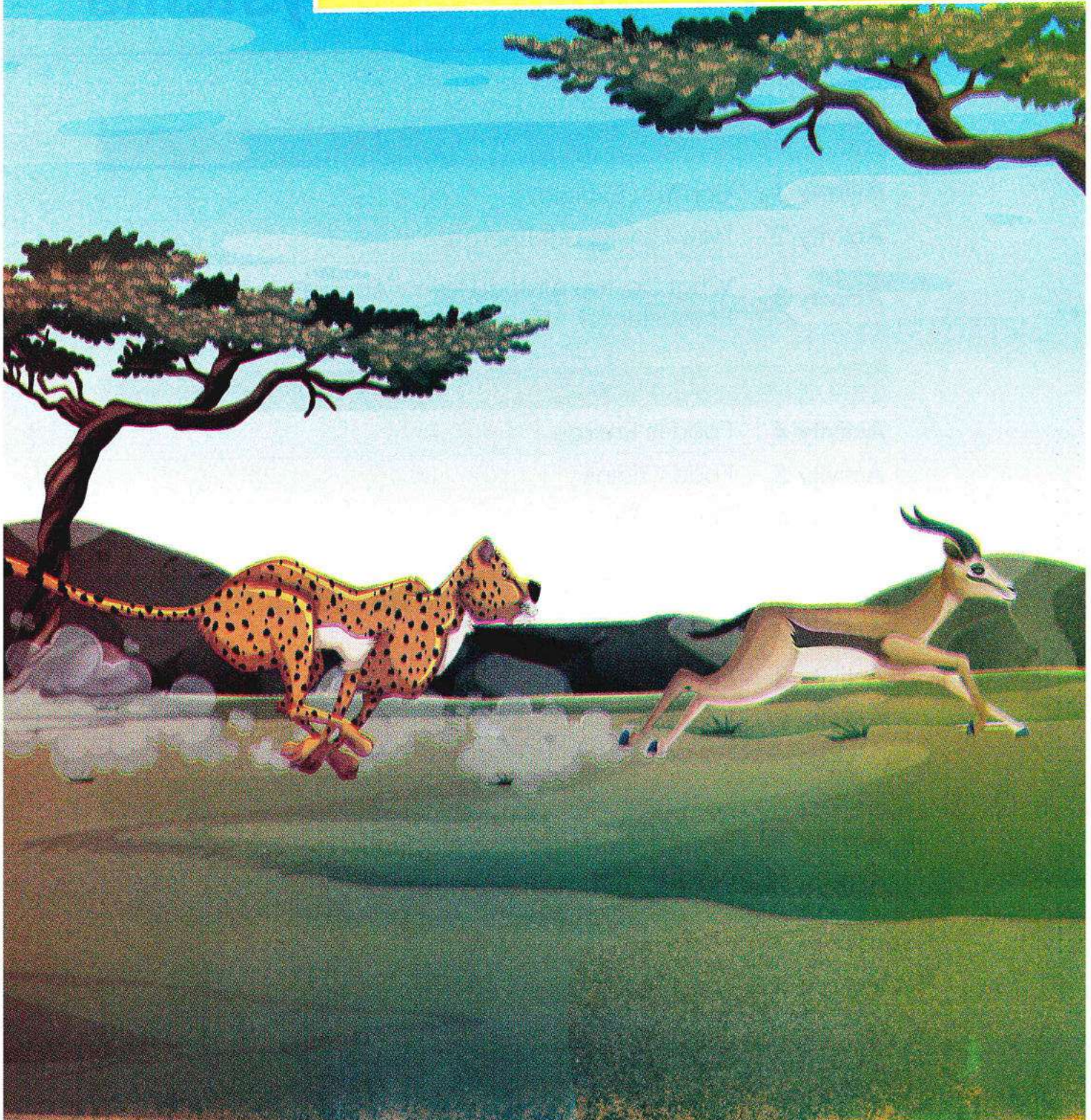
10 What happens if:

1. The seeds of the dandelions are heavy?
.....
2. There are no spines on burdock seeds?
.....

Concept

1.2

Energy Flow in Ecosystems



Concept 2

Energy Flow in Ecosystems

Lesson 1

- Activity 1** Can You Explain?
- Activity 2** How Hawks Get Energy
- Activity 3** What Do You Already Know About Energy Flow in Ecosystems?

Lesson 2

- Activity 4** Food Is Energy
- Activity 5** Food Chains
- Activity 6** Energy Flow

Lesson 3

- Activity 7** Food Chain
- Activity 8** Food Webs
- Activity 9** Interactions in Food Webs

Lesson 4

- Activity 10** Record Evidence Like a Scientist
- Activity 11** Plant-Community Ecologist

Glossary

Lesson (1)

Activity (1)			
Ecosystem	نظام بيئي	Desert	صحراء
Living organisms	كائنات حية	Tundra	صحراء التندرا الجليدية
Biotic factors	عوامل حيوية	Flow	تنتقل
Components	مكونات	Community	مجتمع
Decompose	يتحلل	Ocean	محيط
Abiotic factors	عوامل غير حيوية	Non-living things	عناصر غير حية
Shelter	مأوى	Rainforest	غابات ممطرة

Activity (2)			
Hawk	صقر	Snake	ثعبان
Rabbit	أرنب	Predator	مفترس
Mouse	فأر	Squirrel	سنجاب
Mice	فئران		

Activity (3)			
Worms	ديدان	Caracal	الوشق البري

Lesson (2)

Activity (4)			
Breathing	عملية التنفس	Hard work	عمل شاق
Moving	الحركة	Primary source	المصدر الرئيسي
Thinking	التفكير	Exercises	تمارين
Convert	تتحول	Provide	تمنح

Activity (5)			
Producers	الكائنات المنتجة	Fungi	فطر
Decomposers	الكائنات المحللة	Millipedes	دودة ألفية الأرجل
Secondary consumers	كائنات مستهلكة ثانوية	Tertiary consumers	كائنات مستهلكة من الدرجة الثالثة
Consumers	الكائنات المستهلكة	Primary consumers	كائنات مستهلكة أولية
Bacteria	بكتيريا	Fertility	خصوبة
Alligators	تماسيح	Food chain	سلسلة غذائية
Feeding relationships	علاقات غذائية		

Activity (6)			
Directly	بشكل مباشر	Role	دور
Predator	مفترس	Hunt	يصطاد
Depend on (rely on)	يعتمد على	Prey	فريسة

Lesson (3)

Activities (7, 8, & 9)			
Food web	شبكة غذائية	Interconnected	متداخلة
Interact	يتفاعل		

Lesson (4)

Activities (10 & 11)			
Plant community ecologist	عالم نبات	Damaged habitats	بيئات متضررة
Research	بحث	Natural areas (Prairie)	مناطق طبيعية (براري)
Fur	فراء	Ecology	علم البيئة
Careers	وظائف	Sticky seeds	بذور لزجة
Repairing	إصلاح	Future	مستقبل

Lesson

1

Activity 1 Can You Explain?

An ecosystem helps living organisms survive by providing them with **food**, **water**, and **shelter**.



Ecosystem

It is a community (an area) that contains **living organisms** and **non-living things** that interact with each other.

النظام البيئي: هو مساحة طبيعية تشمل الكائنات الحية والعناصر غير الحية التي تتفاعل معًا.

Components of Ecosystems

Living organisms (Biotic Factors)

Examples:

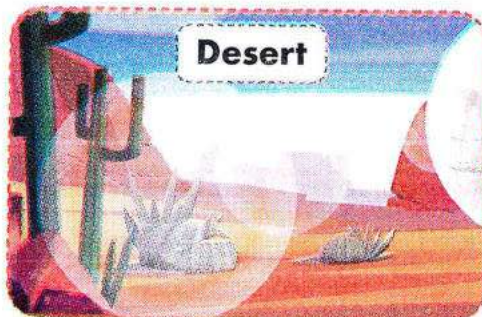
Human – Animals – Plants

Non-living things (Abiotic Factors)

Examples:

Water – Air – Soil – Rocks

Examples of Ecosystems



Desert



Rainforest



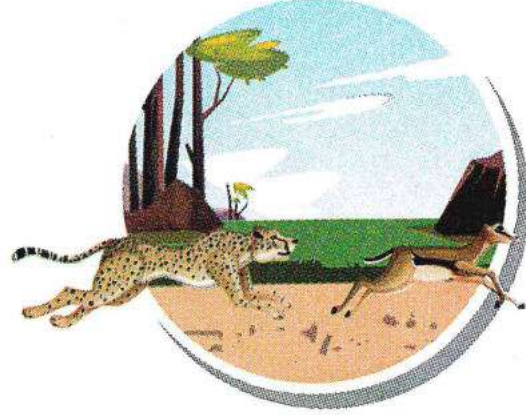
Tundra



Ocean

How does energy flow through an ecosystem?

- Energy flows between living organisms in an ecosystem, where:
 - Energy transfers from plants to animals.
 - Energy transfers between animals when they eat each other.



- تنتقل الطاقة بين الكائنات الحية في النظام البيئي، حيث:
 - تنتقل الطاقة من النباتات إلى الحيوانات
 - تنتقل الطاقة بين الحيوانات عندما يتغذى بعضهم على الآخر.

- When a living organism dies, its body **decomposes**, and its energy returns to the **soil**.



- بعد موت الكائن الحي، يتحلل جسمه وتعود طاقته إلى التربة.

Check your understanding?

» Put (✓) or (x):

- 1 Water is not one of the biotic components of an ecosystem. ()
- 2 A healthy ecosystem helps living organisms survive. ()
- 3 When an animal dies, the energy inside its body disappears. ()
- 4 Plants get their needed energy from the photosynthesis process. ()

Activity 2 How Hawks Get Energy

Unit 1



A hawk is a **meat-eating animal** that eats some small ground animals and some other animals, such as:



Mice



Rabbits



Squirrels



Snakes



Fish



Birds

Hawks don't eat plants, but they eat animals that eat plants. So, they also depend on plants to get energy.

لا تأكل الصقور النباتات، لكنها تأكل الحيوانات التي تأكل النباتات؛ وبالتالي فإنها تعتمد على النباتات للحصول على الطاقة.

- Few predators can attack hawks, such as **eagles** and **other hawks**.



- When a hawk dies, its body **decomposes**, and its energy returns to the soil.



Check your understanding?

» Put (✓) or (x):

- A hawk is a meat-eating animal. ()
- A hawk gets its energy by eating animals only. ()

Activity 3 What Do You Already Know About Energy Flow in Ecosystems?

- » Animals don't choose their food according to its taste.
- » Animals eat what they need to survive.

• تأكل الحيوانات ما تحتاجه من الغذاء؛ للبقاء على قيد الحياة.

• لا تختار الحيوانات غذاءها حسب الطعم.

Rabbits eat grass.



Birds eat worms.



Caracals eat mice and rabbits.



There is a relationship between the energy we get from food and the sun.

- » Plants use sunlight to make their own food, then humans and animals depend on plants to get their energy.



Check your understanding?

» Put (✓) or (x):

- 1 Energy directly flows from grass to hawks. ()
- 2 Plants use sunlight to make their own food. ()

Pony Exercises on Lesson One

Answered

1 Choose the correct answer:

- All the following are considered as ecosystems, except
(a) tundras (b) the space (c) deserts (d) rainforests
-  belong(s) to the non-living components of the ecosystem.
(a) Animals (b) Plants (c) Soil (d) Insects
- Hawks feed on
(a) grass (b) rabbits (c) eagles (d) bean plants
- A hawk can be prey for
(a) a rat (b) a squirrel
(c) an eagle (d) a rabbit
- Hawks get their energy by eating
(a) plants only (b) animals only
(c) plants and animals (d) non-living things
- Which of the following doesn't include an energy transfer?
(a) A bird eats some worms. (b) A hawk eats a squirrel.
(c) A rabbit eats grass. (d) A hawk eats some plant seeds.
- Mice can be eaten by
(a) rabbits and hawks (b) hawks and caracals
(c) owls and grass (d) caracals and rabbits
- Caracals obtain their energy by eating
(a) sharks (b) grass
(c) butterflies (d) mice
- A/An can get its energy from eating grass.
(a) hawk (b) caracal
(c) rabbit (d) eagle

(Giza 2023)

(Aswan 2023)

2 Put (✓) or (X):

1.  An ecosystem consists of living organisms only. ()
2. There is no interaction between the components of an ecosystem. (Menofia 2023) ()
3. Hawks don't eat some types of food such as plants' leaves. (Cairo 2024) ()
4. The energy inside an animal's body is returned to the soil when it dies. ()
5. A hawk can't produce its own food by using sunlight. ()
6. A hawk can get its energy from eating snakes, squirrels, and plants' roots. ()
7. When a rabbit eats grass, the energy transfers from the rabbit to the grass. ()
8. Energy may flow from a hawk to an eagle. ()
9. Hawks can get their energy by eating a rabbit that ate grass. ()

3 Write the scientific term:

1. A place that provides food, water, and shelter to all living organisms in it. (Cairo 2023) (.....)
2. A community that includes living organisms and non-living things that interact with each other. (Cairo 2024) (.....)

4 Complete the following sentences:

1. In an ecosystem, there's an interaction between and
2. The is the main source of the energy that we obtain from food.
3. A hawk eats that eat(s) to get energy.
4. When living organisms die, their energy returns to the

(Alex. 2023)

5 Cross out the odd word:

- Eagle – Hawk – Rabbit – Caracal

(.....)

6 Look at the following figures, then put (✓) or (X):



Figure (1)



Figure (2)

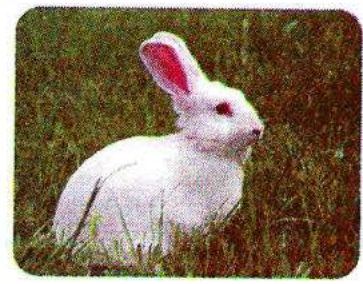


Figure (3)

1. In figure (1), the energy transfers from the snake to the frog. ()
2. The animal in figure (3) gets energy by making its own food. ()
3. The animal in figure (2) gets its needed energy from eating the animal in figure (3). ()
4. When the animal in figure (2) dies, the energy in its body returns to the soil. ()

7 Give a reason for:

- Hawks depend on plants to get their energy.

.....

.....

8 What happens if:

- A hawk lives in an ecosystem that contains plants only?

(Cairo 2023)

.....

.....

Lesson

2

Energy Flow in Ecosystems

Activity 4 Food Is Energy

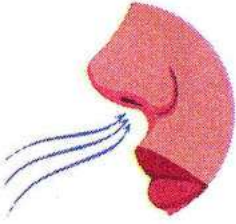
Concept 2

- » Living organisms need **energy** to live, grow, and carry out vital processes.
- » We get energy from the **food** we eat and the **oxygen** we breathe.

• تحتاج جميع الكائنات الحية إلى الطاقة للبقاء والنمو والقيام بالعمليات الحيوية.
• نحصل على الطاقة من الغذاء الذي نأكله والهواء الذي نتنفسه.

Energy helps us do all our daily activities, such as:

Breathing



Thinking



Moving



- Some activities require a lot of energy, such as **hard work** or **doing exercises**.

• بعض الأنشطة تحتاج إلى بذل الكثير من الطاقة مثل: العمل الشاق، وممارسة الرياضة.



- Your body still uses energy even during sleep.

• يحتاج جسمك إلى الطاقة حتى أثناء النوم.



We can classify living organisms into:

Living organisms that produce their own food.

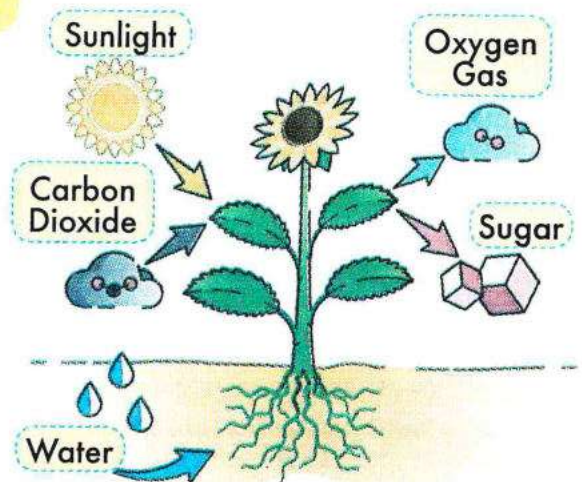
(Including: Plants)

Living organisms that get food from other organisms.

(Including: Animals and Humans)

How do plants get energy?

- Plants can make their own food (**glucose sugar**) inside their **leaves** through the **photosynthesis** process.
- Plants absorb **sunlight** to convert water and carbon dioxide gas into glucose.



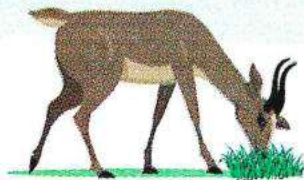
Glucose

It is the food of the plant that provides it with energy to grow and survive.

How do animals get energy?

Different animals can get their food by:

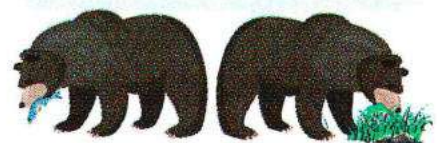
Eating plants only.



Eating animals only.



Eating plants and animals.



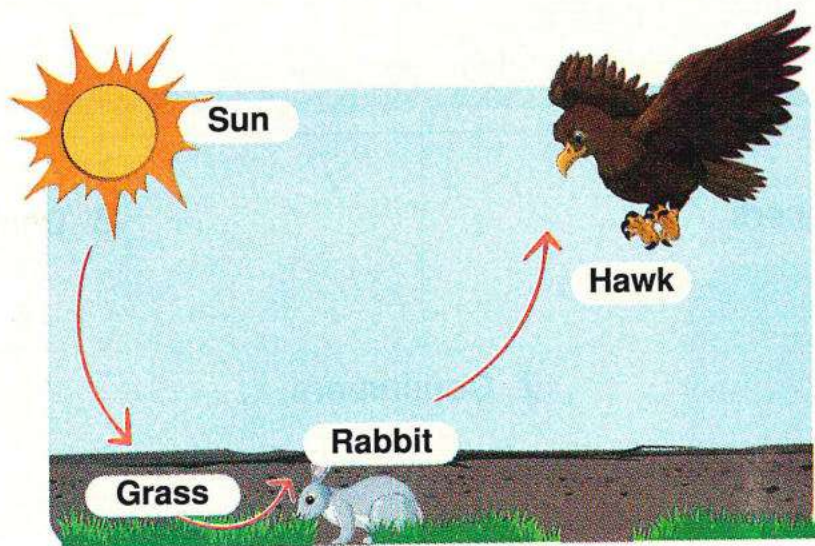
How do humans get energy?

- Humans can eat both plants and animals.



- The sun is the **primary source (main source)** of energy for all living organisms on Earth.
- The energy produced from the sun passes through all living organisms on Earth.

• تعد الشمس المصدر الرئيسي للطاقة لكل الكائنات الحية التي تعيش على كوكب الأرض.
• تنتقل الطاقة الشمسية عبر جميع الكائنات الحية على كوكب الأرض.



Check your understanding?

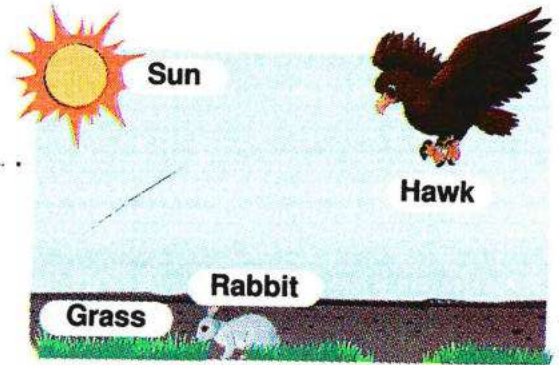
» Put (✓) or (X):

- 1 Our bodies don't need energy when we are sleeping. ()
- 2 Plants can make their food in the absence of the sun. ()
- 3 Animals depend on plants or other animals to get energy. ()
- 4 Humans can get energy from eating plants only. ()

Activity 5 Food Chains

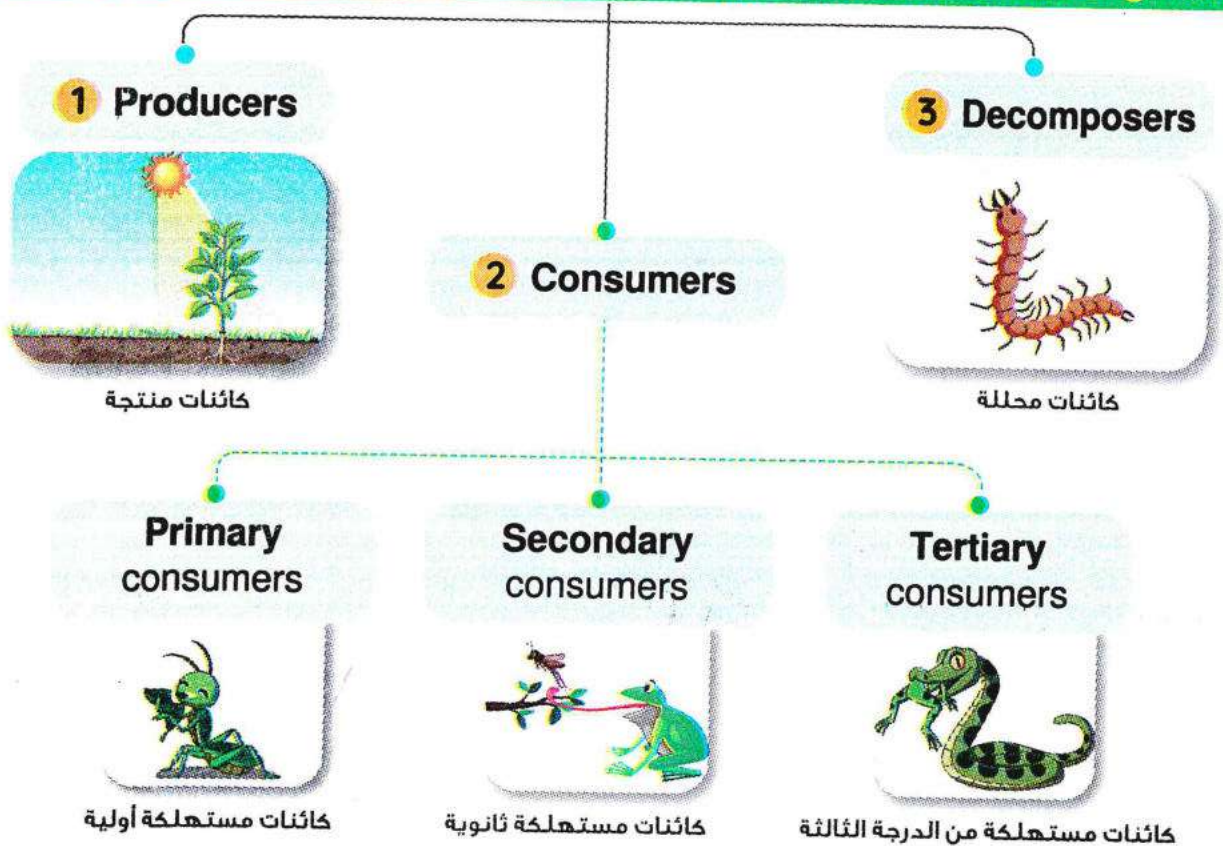
» Complete the following sentences from the words on the figure:

- 1 The hawk can get energy by eating the
- 2 The can produce its own food.
- 3 The is the primary source of energy for all living organisms.



- » All living organisms need energy to **grow** and **survive**.
- » Some living organisms can produce their own food, while others can't.

Living organisms are classified according to the way of feeding into:



1 Producers

They are living organisms that can make their own food in the presence of sunlight.

Examples:

- On Earth, nearly all producers are plants.
- Plants produce their food in the form of glucose, which is rich in energy.



Grass



Trees

2 Consumers

They are living organisms that eat other living organisms to get energy because they can't make their own food.

Consumers are classified into

Primary Consumers

They are animals that eat producers, and they are known as **herbivores**.

Secondary Consumers

They are animals that eat primary consumers.

Tertiary Consumers

They are animals that eat secondary consumers.

Examples

Many insects, mice, and rabbits



Birds and frogs



Large meat-eating animals, such as alligators, sharks, and lions



NOTE:

- Green plants are producers, while animals and humans are consumers.

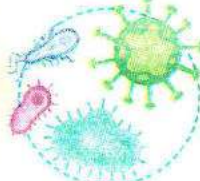
3 Decomposers

They are living organisms that carry out the decomposition process by breaking down or decaying dead organisms.

Examples:



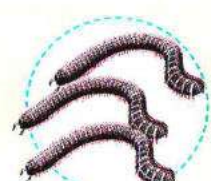
Fungi



Bacteria



Worms



Millipedes

Importance:

- 1 They recycle nutrients back into the ecosystem through the decomposition process.
- 2 They increase soil fertility, which is important for plants' growth.

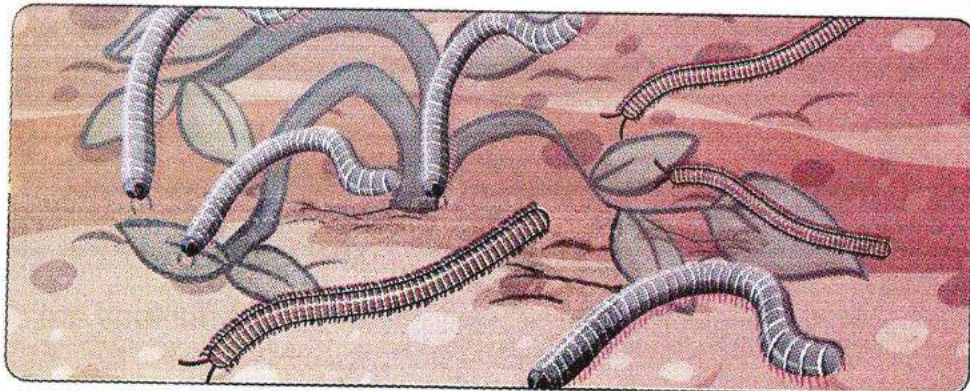
1 تعيد الكائنات المُحلِّلة تدوير العناصر الغذائية مرة أخرى إلى النظام البيئي خلال عملية التحلل.

2 تزيد من خصوبة التربة اللازمة لنمو النباتات.



• **Earthworms** and **millipedes** feed on dead plant remains, and they produce **waste rich in nutrients**, which increases soil fertility.

• دودة الأرض والديدان ألفية الأرجل تتغذى بشكل رئيسي على بقايا النباتات الميتة، كما أن الفضلات التي تخرجها غنية بالعناصر الغذائية التي تزيد من خصوبة التربة.



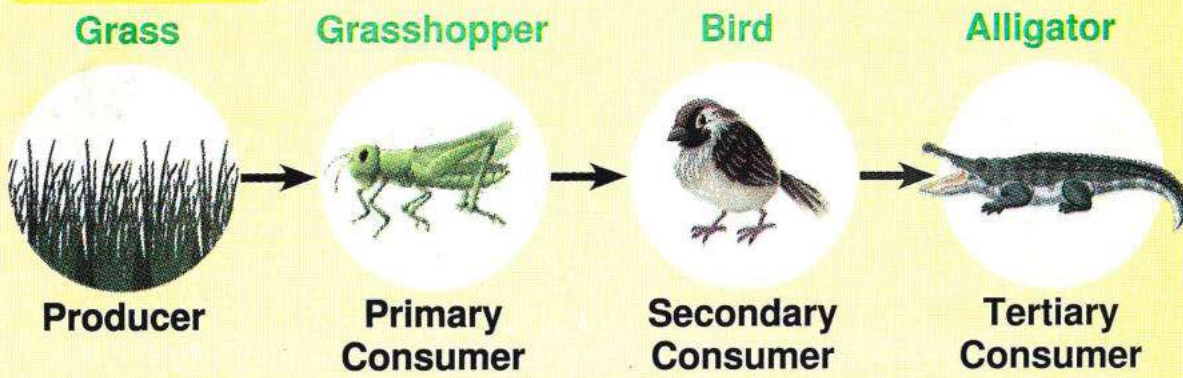
- » In an ecosystem, energy flows among living organisms, which can be represented by a **food chain**.

• في النظام البيئي تنتقل الطاقة بين الكائنات الحية فيما يُعرف بـ«السلسلة الغذائية».

Food chain

It is a model that shows a linear set of feeding relationships and the flow of energy among living organisms.

Examples:



From the previous food chain, we observe that:

The **first** link in the food chain

is

producers.

The **second** link in the food chain

is

primary consumers.

The **third** link in the food chain

is

tertiary consumers.

The **final** link in the food chain

is

decomposers.



Check your understanding?

» Form a food chain by using the following organisms:

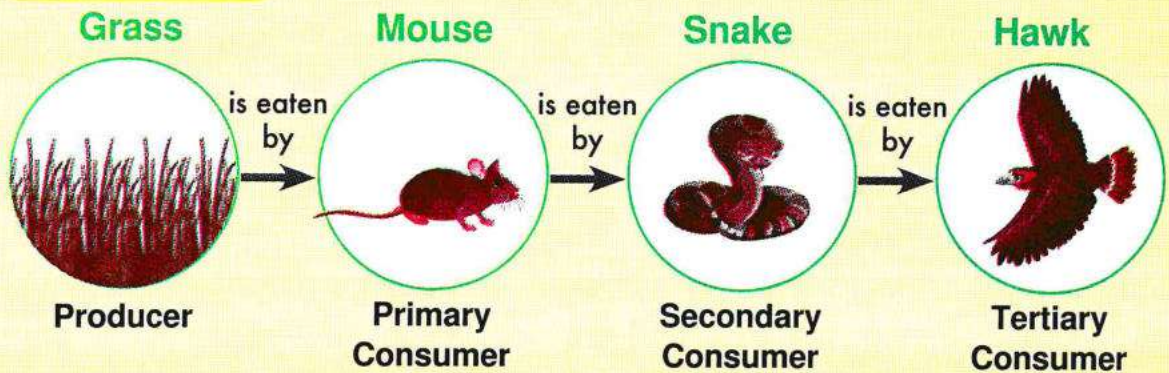
Snakes – Grass – Hawks – Mice

Activity 6 Energy Flow

» You have learned that:

- Green plants can get the needed energy directly from the sun.
- Animals can't get energy directly from the sun, so they depend on other living organisms to get the energy they need.

Examples:



Grass makes its own food using energy from the sun.



The **mouse** eats the grass to get energy.



The **snake** eats the mouse to get energy.

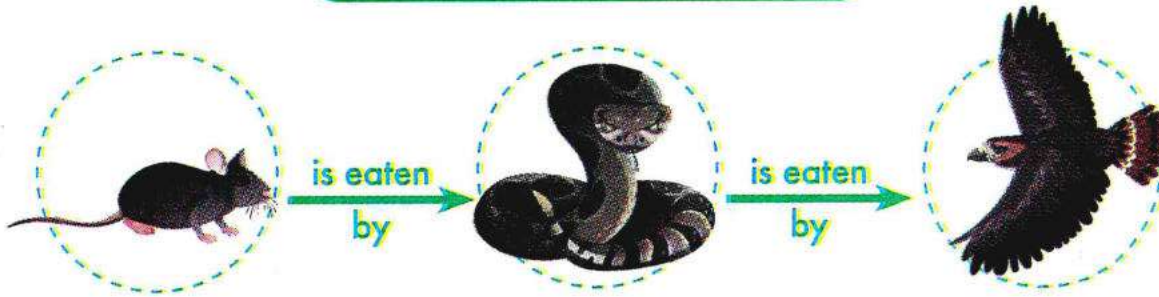


The **hawk** eats the snake to get energy.

From the previous food chain, we find that:

- The energy from the **sun** passes to the **grass**, then to the **mouse**, then to the **snake**, and finally to the **hawk**.
- The grass is able to make its own food from the sun, while other animals cannot make their own food.

Predator and Prey



A **mouse** is a prey for the snake.

A **snake** is a predator for the mouse, and it is a prey for the eagle.

A **hawk** is a predator for the snake.

Predator

It is the animal that hunts (eats) another animal.



Prey

It is the animal that is hunted (eaten) by another animal.



NOTE:

Both predators and prey pass food and energy through the food chain.

• ينتقل الغذاء والطاقة في السلسلة الغذائية عن طريق كل من الحيوانات المفترسة والفرائس.



Check your understanding?

» Put (✓) or (x):

- 1 Nearly all plants on Earth are considered producers. ()
- 2 A predator is the animal that eats small plants. ()

Pony Exercises on

Lesson Two

Answered

1 Choose the correct answer:

-  is the main source of energy for all living organisms. (Alex. 2023)
☐ (a) Food ☐ (b) A plant ☐ (c) Water ☐ (d) The sun
- When you are sleeping, you need
☐ (a) no energy ☐ (b) a lot of energy
☐ (c) less energy than you need while exercising
☐ (d) more energy than you need while doing hard work
- Nearly all plants on Earth are considered as
☐ (a) consumers ☐ (b) decomposers ☐ (c) producers ☐ (d) prey
- Which organism depends on other organisms to get energy?
☐ (a) Grass ☐ (b) Mouse ☐ (c) Sunflower ☐ (d) Vine
-  All the following are considered producers, except
☐ (a) carrot ☐ (b) cactus ☐ (c) pine ☐ (d) squirrel
- The first link in any food chain is the (Alex. 2023)
☐ (a) consumers ☐ (b) producers ☐ (c) decomposers ☐ (d) sun
- A lion is considered a (Alex. 2024)
☐ (a) producer ☐ (b) grass-eater ☐ (c) meat-eater ☐ (d) decomposer
- A food chain is a model that shows the flow of through an ecosystem.
☐ (a) food ☐ (b) energy ☐ (c) oxygen ☐ (d) carbon dioxide
- Any food chain starts with (Beni Suef 2023 – Cairo 2024)
☐ (a) insects ☐ (b) plants ☐ (c) fungi ☐ (d) bacteria
- Which group includes only consumers?
☐ (a) Grass, mice, and birds
☐ (b) Lions, hawks, and pine trees
☐ (c) Eagles, snakes, and birds
☐ (d) Fungi, bacteria, and worms

11. Which of the following is a correct food chain?

- (a) Grass → Hawk → Snake
- (b) Grass → Deer → Lion
- (c) Fungi → Mouse → Snake
- (d) Butterfly → Grass → Owl

12. Many insects are considered

- (a) producers
- (b) decomposers
- (c) primary consumers
- (d) secondary consumers

(Giza 2024)

13. All the following are consumers, except

(Alex. 2024)

- (a) hawks
- (b) insects
- (c) grass
- (d) rabbits

14. Decomposers always the soil.

- (a) pollute
- (b) damage
- (c) harm
- (d) benefit

(Damietta 2023)

15. decompose the remains of dead organisms into nutrients.

- (a) Bacteria and butterflies
- (b) Fungi and locusts
- (c) Worms and butterflies
- (d) Bacteria and fungi

(Qalyubia 2024)

16. The final link in any food chain is the

(Alex. 2023)

- (a) consumer
- (b) producer
- (c) decomposer
- (d) food web

17. In a food chain, the energy transfers from the snake to the

- (a) grass
- (b) mouse
- (c) rabbit
- (d) eagle

18. In a food chain, the energy transfers from

(Dakahlia 2023)

- (a) a predator to prey
- (b) a predator to a producer
- (c) prey to a predator
- (d) a consumer to a producer

19. organisms increase soil fertility.

- (a) Producer
- (b) Herbivore
- (c) Decomposer
- (d) Consumer

20. Fungi are found in the of the food chain.

- (a) beginning
- (b) middle
- (c) end
- (d) start

21. and can make their own food by using the sunlight.

- (a) Fungi – trees
- (b) Grass – butterflies
- (c) Millipedes – worms
- (d) Shrubs – trees

2 Put (✓) or (X):

1. Breathing doesn't require any energy. ()
2. Food and oxygen provide the body with the needed energy. (Alex. 2023) ()
3. Producers make their own food, while decomposers return nutrients to the ecosystem. (Gharbiya 2023) ()
4. In plants' leaves, water and carbon dioxide are converted into glucose. ()
5.  A snake is a predator and prey in some food chains. (Giza 2023) ()
6. Consumers use carbon dioxide gas to make their food. (Giza 2023) ()
7. Food chains start with decomposers. (Giza 2023) ()
8. Without decomposers, the Earth would be full of dead bodies. ()
9. The first link in any food chain is a consumer. (Damietta – Giza 2023) ()
10.  In the ecosystem, energy is transferred from one organism to another. ()
11. The sun produces energy that decomposers use to make their food. (Cairo 2024) ()

3 Correct the underlined words:

1.  Producers need moonlight to perform photosynthesis. (.....)
2. Energy transfers when a secondary consumer feeds on a producer. (Damietta 2023) (.....)
3. Living organisms can be classified into four groups according to their way of feeding. (.....)
4. The animal that is eaten by another animal is called a predator. (.....)

4 Write the scientific term:

1. The primary source of energy for all living organisms. (.....)
2. A model that shows a linear set of feeding relationships and energy flow between living organisms. (Helwan 2024) (.....)
3. They are consumers that feed on secondary consumers. (Cairo 2023) (.....)
4. A gas that is produced from the photosynthesis process. (Damietta 2023) (.....)

5. It is a gas that is present in air and is necessary for the formation of plant food.
(Ismailia 2023) (.....)
6. They are organisms that break down dead organisms' bodies.
(Damietta 2023) (.....)
7. They are the final link in a food chain.
(Assiut 2023) (.....)

5 Complete the following sentences:

1. Insects, such as butterflies, are considered
2. Waste of worms and millipedes is rich in, which increase(s)
3. Living organisms are classified according to their way of into producers,, and
4. Plants are able to produce their own food in the form of, which is rich in
5. are organisms that decay dead animals and plants.
(Dakahlia 2023)
6. depend on producers to get their energy.
(Alex. 2023)

6 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. Herbivores	Ⓐ release oxygen gas in the air during photosynthesis.
2. Producers	Ⓑ benefit the soil and help plants to grow healthy.
3. Predators	Ⓒ can get energy by eating animals only.
4. Decomposers	Ⓓ can get energy by eating plants only.

1. 2. 3. 4.

Interactions of Organisms

Unit 1

7 Cross out the odd word:

1. Mouse – Eagle – Grass – Snake
2. Pine trees – Apple trees – Insects – Grass
3. Bacteria – Birds – Millipedes – Fungi
4. Insects – Alligators – Worms – Birds

(Cairo 2023) (.....)

(.....)

(.....)

(.....)

8 Form food chains by using the following organisms:

1. Grass – Hawk – Snake – Bacteria – Mice

(Ismailia & Minia 2023)

2. Rabbit – Snake – Hawk – Grass

(Cairo 2023)

3. Duck – Grass – Fox

9 Classify the following organisms into producers, consumers, and decomposers:

(Dakahlia 2024)

Snakes – Green plants – Bacteria – Fungi – Trees – Rabbits

Producers	Consumers	Decomposers
.....		
.....		

10 Study the following model, then complete the sentences below:



1. This model is called a
2. The snake is prey for the and a predator for the
3. The can make its own food by the process.
4. carry out the decomposition process.

11 Look at the following figures, then choose the correct answer:**Figure (1)****Figure (2)****Figure (3)****Figure (4)**

- In figure (1), the bear is considered a for the fish.
 (a) herbivore (b) prey (c) predator
- In figure (1), both fish and bear are considered
 (a) producers (b) consumers (c) decomposers
- In figure (2), elephants only eat leaves, fruits, and grass, so they are considered
 (a) predators (b) producers (c) herbivores
- The organisms in figure (3) get their energy by
 (a) feeding on other plants (b) making their own food
 (c) decaying dead organisms
- Which sentence is correct about the organism in figure (4)?
 (a) It can make its own food.
 (b) It increases the soil fertility.
 (c) It is considered a consumer.

12 Give a reason for:

- The sun is very important for the life continuity.

.....

.....

- Green plants are considered producer organisms.

(Cairo 2024)

.....

.....

3. Hawks depend on plants to get energy.

(Alex. 2024)

4. Decomposers play an important role in the ecosystem.

(Menofia 2024)

5. Humans and animals are considered consumers.

(Alex. 2023)

13 What happens if:

1.  Sunlight does not reach the Earth?

2. All primary consumers disappear from an ecosystem?

(Giza 2023)

3. The decomposers disappear from Earth?

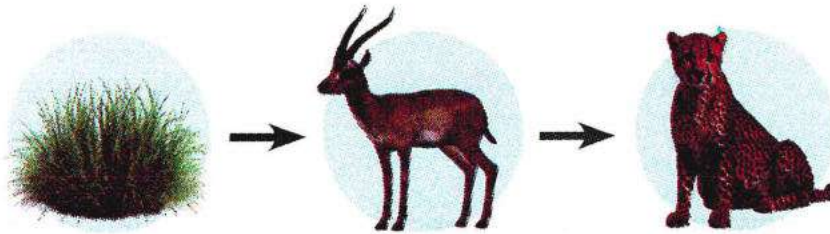
(Banha 2023)

Lesson

3

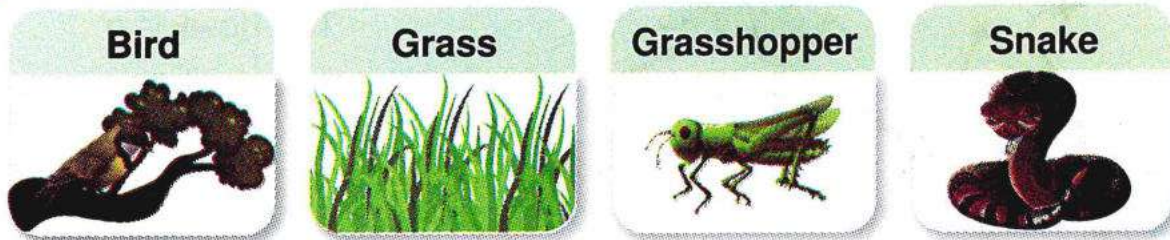
Activity 7 Food Chain

1 Look at the following food chain, then put (✓) or (X):

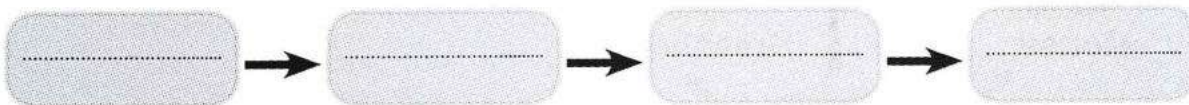


1. Cheetah is an example of a primary consumer. ()
2. Cheetah depends directly on grasses to get energy. ()

2 Study the following figures, then answer the questions below:



A Complete the following food chain by writing the names of the organisms in the correct boxes.



B Complete using the following words:

(predator – prey – producer – predator and prey)

1. The snake is considered a
2. The grasshopper is considered a
3. The bird is considered a
4. The grass is considered a

Activity 8 Food Webs

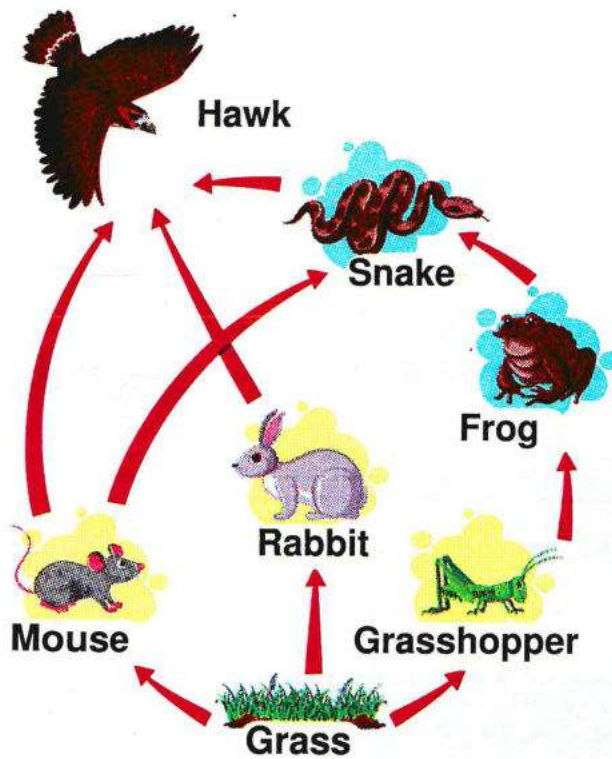
- » Each living organism could be a part of many food chains.
- » When many food chains interconnect, they form a more complex and larger model called a "food web".

• كل كائن حي هو جزء من عدة سلاسل غذائية.

• عندما تتداخل العديد من السلاسل الغذائية معًا، فإنها تُشكّل نموذجًا أكبر وأكثر تعقيدًا يُسمى «الشبكة الغذائية».

Food web

It is a model that shows several interconnected food chains among living organisms.



The **hawk** is a top predator.

The arrow (→) shows the transfer of energy between the living organisms.



Check your understanding?

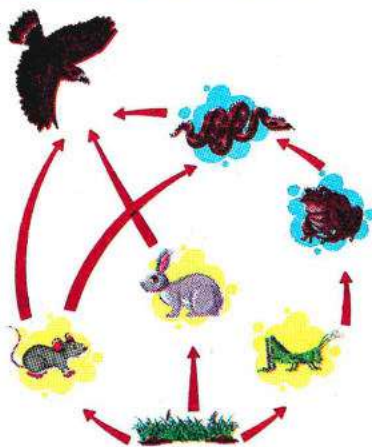
» Study the previous food web, then complete the following sentences:

- 1 The number of primary consumers is
- 2 The frog is a predator for the, while it is prey for the
- 3 The snake is a tertiary consumer when eating the

Activity 9 Interactions in Food Webs

- » The food web gives us better information about each living organism because in nature, animals usually eat more than just one thing!

Food Web



Number of living organisms

Many living organisms.

Food relationships

It shows **many** food relationships in an ecosystem.

Food Chain



Few living organisms.

It shows a **few** food relationships in an ecosystem.

From the previous table, we can conclude that it is better to use a food web to show interactions among living organisms than a food chain.

Check your understanding?

» Put (✓) or (x):

- 1 Many different consumers may eat the same producer. ()
- 2 A food chain consists of many interconnected food webs. ()

Pony Exercises on Lesson Three

Answered

1 Choose the correct answer:

1. All the following are considered producer organisms, except
(a) grasses (b) hawks (c) seeds (d) trees
2. The interconnected food chains are called (Minia 2023)
(a) a food source (b) an ecosystem (c) a food web (d) decomposition
3. A food web shows the interactions between (Fayoum 2023)
(a) a few living organisms (b) many non-living things
(c) many living organisms (d) a few non-living things
4. The frog is considered a when it feeds on locusts that eat grass.
(a) producer (b) primary consumer
(c) secondary consumer (d) tertiary consumer
5. Which of the following describes the prey-predator relationship?
(a) Hawk and grass (b) Lion and deer
(c) Frog and rock (d) Grass and seed
6. is a relationship between a consumer and a producer.
(a) A lion hunting a deer
(b) A locust feeding on a leaf
(c) A plant making photosynthesis
(d) Worms decomposing a dead rabbit
7. A snake is considered a tertiary consumer if it feeds on
(a) a hawk (b) a rabbit (c) a frog (d) grass
8. Hawks eat rabbits to get energy; this means that
(a) hawks are prey (b) rabbits are predators
(c) hawks are predators (d) hawks and rabbits are predators
9. can't get their energy from the sun directly.
(a) Producers (b) Plants (c) Grasses (d) Consumers

2 Put (✓) or (X):

1. A hawk can get its needed energy directly by eating beetles. (Alex. 2023) ()
2. Humans can eat plants and animals. (Beni Suef 2023) ()
3.  All living organisms depend on each other for getting energy. ()
4.  A food chain is a group of interconnected food webs. ()
5. A food web shows an interaction between few living organisms. (Gharbiya 2023) ()
6. Humans feed on producers or primary consumers. ()
7. Secondary consumers get their energy directly from producers. ()

3 Write the scientific term:

1. It transfers between animals a food web to help them survive. (Damietta 2023) (.....)
2. A network of many interconnected food chains. (.....)

4 Complete the following sentences using the words below:

(prey – grass – food web – primary consumers – predator)

1. Humans can eat producers and (Cairo 2023)
2. A frog could be a for the beetle, and a for the snake.
3. The is a suitable food source for a deer.

5 Form food chains by using the following organisms:

1. Frog – Grass – Locust – Snake – Owl (Alex. 2024)
.....
2. Frog – Grass – Snake – Grasshopper – Hawk (Giza 2023)
.....
3. Hawk – Snake – Insect – Grass – Frog (Dakahlia 2023)
.....

6 Look at the following figure, then choose the correct answer:

1. The following figure represents

- a
 (a) food chain (b) food web

2. The rabbit, mouse, and grasshopper are considered

- (a) producers
 (b) primary consumers
 (c) secondary consumers

3. When all grasshoppers disappear from this ecosystem, will die or move to another ecosystem.

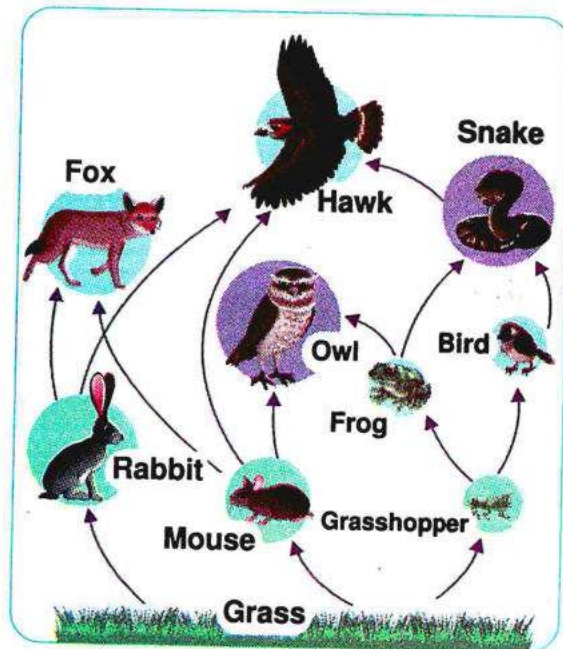
- (a) frogs only (b) birds only (c) both birds and frogs

4. The hawk is considered a consumer when it eats the mouse.

- (a) tertiary (b) primary (c) secondary

5. The absence of causes the death of all the organisms in this ecosystem.

- (a) grass (b) rabbits (c) foxes



7 Look at the following figure, then choose the correct answer:

1. Letter (.....) represents a producer.

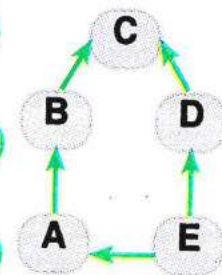
(A – E)

2. Letter (B) represents a consumer.

(primary – secondary)

3. Letter (C) is a tertiary consumer when it feeds on letter (.....).

(B – D)



8 Give a reason for:

- A food web is an energy flow system.

Lesson 4

Activity 10 Record Evidence Like a Scientist

Concept 2

» Now you have learned about how energy moves through an ecosystem, look again at this image. You first saw this in Activity (2).



Question:

How can you describe how hawks get energy?

My Claim:

Evidence:

Scientific Explanation with Reasoning:

STEM in Action

Activity 11 Plant-Community Ecologist

Dr. Becky Barak



Job

- **Plant community ecologist**

(It means she studies groups of plants.)

Where does she work?

- She does her researches in **natural areas (prairie)**, where plants and animals exist.

Studies

- She learned about **ecology**.
- She studied **restoration ecology**.

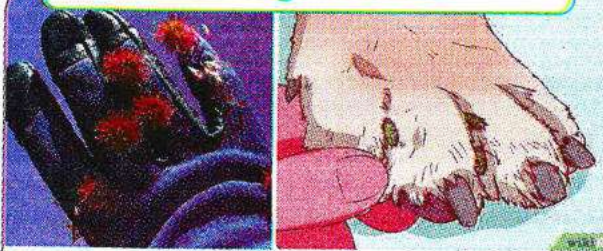
(Restoration ecology means repairing damaged habitats.)

- الوظيفة: عالمة بيئية متخصصة في النبات (مما يعني أنها تدرس مجموعة واسعة من النباتات).
- أين تقوم بعملها؟: تقوم بكل أبحاثها في الأماكن الطبيعية (البراري)؛ حيث توجد الحيوانات والنباتات.
- دراستها: - قامت بدراسة علم البيئة. - قامت بدراسة الإصلاح البيئي (الإصلاح البيئي: هو إعادة بناء البيئات المتضررة).

Seed Dispersal

- » Dr. Barak has learned that different plants need different ways to disperse their seeds.

Sticky Seeds



Light Seeds



Ways of Seed Dispersal

- Their seeds can stick to **humans' clothes** or **animals' fur** to be carried to another environment.

• تلتصق البذور اللزجة بملابس الإنسان وفراء الحيوانات لتنتقل لبيئة أخرى.

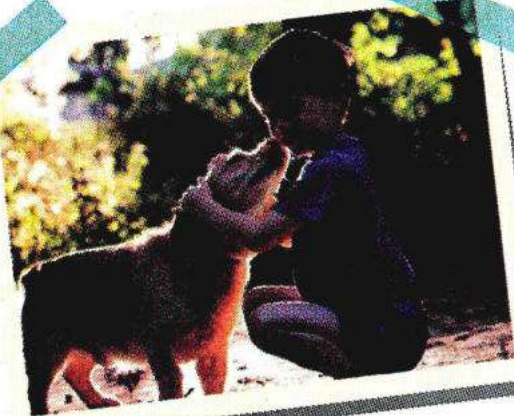
- They are dispersed by **wind** to be carried away to another environment.

• تنتشر البذور الخفيفة بفعل الرياح ليتم حملها لتنتقل لبيئة أخرى.

Careers in Ecology

- » You can share in **conservation** or **restoration** work in your area to help take care of plants and animals.
- » Your interest in nature could lead to a career in ecology in the future.

Concept 2



- من المهم المشاركة في أعمال الحفاظ أو الإصلاح البيئي في منطقتك؛ للمساعدة على رعاية النباتات والحيوانات.
- قد يؤدي اهتمامك بالطبيعة الآن إلى أن تعمل في مجال علم البيئة في المستقبل.



Check your understanding?

» Put (✓) or (x):

- 1 Dr. Becky Barak does all of her researches inside a lab. ()
- 2 Sticky seeds can be dispersed by wind. ()

Pony Exercises on

Lesson Four

Answered

1 Choose the correct answer:

- All the following ways help in dispersing plants' seeds, except
(a) wind (b) sunlight (c) humans (d) water (Qalyoubia 2023)
- Wind plays a role in the dispersal of seeds. (Cairo 2023)
(a) sticky (b) heavy (c) floating (d) light
- Dr. Barak prefers to do her researches in
(a) labs (b) hospitals (c) natural areas (d) universities
- When seeds fly away to a new habitat, this represents
(a) seed dispersal (b) respiration
(c) photosynthesis (d) reproduction
- Humans can be a reason to disperse seeds.
(a) light (b) heavy (c) smooth (d) sticky

2 Put (✓) or (X):

- Dr. Becky Barak is a plant-community ecologist. ()
- Dr. Becky Barak does her researches inside a lab. ()
- All plants disperse their seeds by the same way. ()
- Restoration ecology means rebuilding damaged habitats. ()

3 Write the scientific term:

- The suitable ecosystem for plant-community ecologists to do their researches. (.....)
- The process of rebuilding the habitats that have been damaged. (.....)

4 Give a reason for:

- Sticky seeds can be dispersed by humans or animals.

Concept

1.3

Changes in Food Webs



Concept 3

Changes in Food Webs

Lesson 1

- | | |
|------------|--|
| Activity 1 | Can You Explain? |
| Activity 2 | Protecting Ecosystems |
| Activity 3 | What Do You Already Know About How Food Webs Can Change? |

Lesson 2

- | | |
|------------|------------------------|
| Activity 4 | Energy Flow Body Model |
| Activity 5 | Desert Food Web |
| Activity 6 | Population Changes |

Lesson 3

- | | |
|------------|-------------------|
| Activity 7 | Habitat Loss |
| Activity 8 | Plastic Pollution |

Lesson 4

- | | |
|-------------|----------------------------------|
| Activity 9 | Record Evidence Like a Scientist |
| Activity 10 | Habitat Restoration |

Glossary

Lesson (1)

Activity (1)					
Pollution	تلوث	Drought	جفاف	Ecosystem	نظام بيئي
Activity (2)					
Plastic garbage	مخلفات بلاستيكية	Human activities	أنشطة بشرية	Invasive species	كائنات مجتاحة
Manage	يتحكم	Protect	يحمي	Overfishing	الصيد الجائر
Prevent	يمنع	Conserve	يحافظ	Harm	يضر
Activity (3)					
Relationships	علاقات	Gentle rain	أمطار قليلة	Balance	توازن
Collapse	ينهار	Improve	يحسن	Destroy	يدمر
				Heavy rain	أمطار كثيفة
				Floods	فيضانات

Lesson (2)

Activity (4)					
Decomposers		الكائنات المُحللة	Fungi		الفطريات
Activity (5)					
Rabbit (Hare)	أرنب	Fox	ثعلب	Mouse	فأر
Activity (6)					
Population	أعداد الكائنات الحية	Population change	التغير في أعداد الكائنات الحية	Depend on	يعتمد على
Dive	يفغطس	Float	يطفو		
					Climate change
					تغير المناخ

Lesson (3)

Activity (7)					
Habitat loss	فقدان الموطن	Adding buildings	بناء المباني	Coral bleaching	ابيضاض الشعاب المرجانية
Rise (increase)	زيادة	Extinction	انقراض	Diving	الغطس
Diverse	تنوع	Coral reefs	شعاب مرجانية	Get rid	يتخلص من
Fishing	الصيد	Valuable	قيم		
Activity (8)					
Large quantities	كميات كبيرة	Grains of rice	حببات الأرز	Microplastics	الجسيمات البلاستيكية
Coral	المرجان	Filter	ينقي	Jellyfish	قنديل البحر
Sharp	حاد	Recycle	يعيد تدوير	Whales	الحيتان
Turtle	السلحفاة	Toxic	سام		
					Not nutritious
					عديمة القيمة الغذائية
					Ingest
					يبتلع
					Reduce
					يقلل

Lesson (4)

Activities (9 & 10)					
Solutions	حلول	Habitat restoration	إصلاح الموطن	Engineers	مهندسون
Rehabilitation	إعادة تأهيل	Pieces	قطع	Recovering	إصلاح
Erode riverbanks	تجريف ضفاف الأنهار	One-use product	منتج يُستخدم مرة واحدة	Coastal communities	المجتمعات الساحلية
Scientists	علماء	Restore	يعيد	Nursery	مشتل
Bringing back	استعادة	Wetlands	الأراضي الرطبة		
					Drain
					تجف
					Reproduce
					يتكاثر
					Collect (harvest)
					يجمع (يحصد)
					Rebuilding
					إعادة بناء

Lesson

1

Activity 1 Can You Explain?

» Look at the image, and then tick (✓) the correct answer:

- 1 The water of the lake is
☐ polluted ☐ evaporated
- 2 Drought occurs due to temperature.
☐ high ☐ low
- 3 This ecosystem gets
☐ benefits ☐ harmed



» In the previous figure, the ecosystem becomes **unhealthy** due to lack of water, so many living organisms move to another place, and some of them die.

• في الشكل السابق، أصبح هذا النظام البيئي غير صحي بسبب نقص المياه؛ لذلك تنتقل العديد من الكائنات الحية إلى مكان آخر ويموت بعضها.

We can conclude that all organisms in a food web may be affected by any change in the environment, for example:

If

Then

- ① Producers disappear from an ecosystem.



Consumers will move to another place to find food or they will die.

- ② The number of one species of consumers increases.



The food resources may run out, so they will die.

• يمكننا أن نستنتج أن: جميع الكائنات الحية في الشبكة الغذائية قد تتأثر بأي تغير في البيئة.

① إذا اختفت الكائنات المنتجة من النظام البيئي ستضطر الكائنات المستهلكة للانتقال إلى مكان آخر للبحث عن الغذاء أو قد تموت.

② إذا ازداد عدد نوع معين من الكائنات المستهلكة، فقد تختفي الموارد الغذائية؛ مما يؤدي لموت الكائنات المستهلكة.

Activity 2 Protecting Ecosystems

» Put (✓) or (X):

- 1 Throwing plastic garbage in the oceans harms marine organisms. ()
- 2 Marine organisms need clean water to survive. ()

Human Activities That Impact Marine Ecosystems

1 Overfishing



It is a human activity that leads to **decreasing** the number of fish in rivers, seas, and oceans.

2 Water pollution



It is the harm that happens to water when humans throw **waste materials** into the water of rivers, seas, or oceans.

- 1 الصيد الجائر: هو نشاط بشري يؤدي لانخفاض عدد الأسماك في الأنهار والبحار والمحيطات.
- 2 تلوث المياه: هو الضرر الذي يحدث للمياه عندما يقوم الإنسان برمي المخلفات في مياه الأنهار أو البحار أو المحيطات.

What happens if ...

Human introduces a new predator to an ecosystem?

- The ecosystem gets harmed because this predator becomes an invasive species that kills the other organisms.



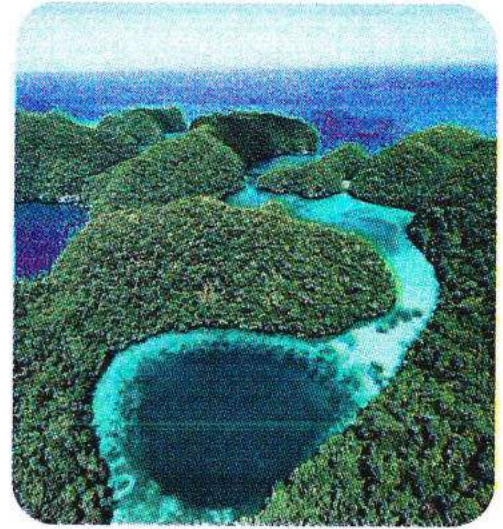
On any island, we can observe that what is happening on land affects what is happening in marine environment.

في أي جزيرة، يمكننا أن نلاحظ أن ما يحدث على اليابسة يؤثر على ما يحدث في البيئة البحرية.

Example: Palau Island

» People in Palau use different **conservation programs** to protect the marine environment and its resources by creating well-designed protected marine environments by:

- 1 Controlling human activities on land to prevent water pollution by avoiding throwing waste into the ocean.
- 2 Preventing fishers from overfishing the coral reefs areas.



يستخدم الناس في بالاو برامج مختلفة للحفاظ على البيئة البحرية ومواردها من خلال إنشاء بيئات بحرية محمية مصممة بشكل جيد، وذلك من خلال:

- 1 تقوم بالاو بمراقبة الأنشطة البشرية على اليابس لمنع حدوث تلوث في المياه عن طريق تجنب إلقاء المخلفات في مياه المحيط.
- 2 تقوم بالاو بمنع الصيادين من الصيد الجائر في مناطق الشعاب المرجانية.



Check your understanding?

» Put (✓) or (x):

- 1 Human activities on land don't affect the marine environment. ()
- 2 Overfishing affects the survival of desert organisms. ()

Activity 3 What Do You Already Know About How Food Webs Can Change?

» Relationships between organisms play an important role in keeping the balance of the ecosystem.

Any change in the ecosystem affects the food web, as follows:

What happens if ...	Result	Reason
There is a gentle rain in the desert?	The desert ecosystem might be improved . 	• Rainwater helps producers grow. • Consumers feed on producers.
There is a heavy rain in the desert?	The desert ecosystem might be harm ed. 	• Heavy rains lead to floods, which destroy the ecosystem.
There is a drought in the desert?	The desert ecosystem might collapse . 	• Producers die. • Consumers that depend on producers die.
There are many top predators in the food web?	Organisms in the food web may be harm ed. 	• Predators eat all other living organisms.

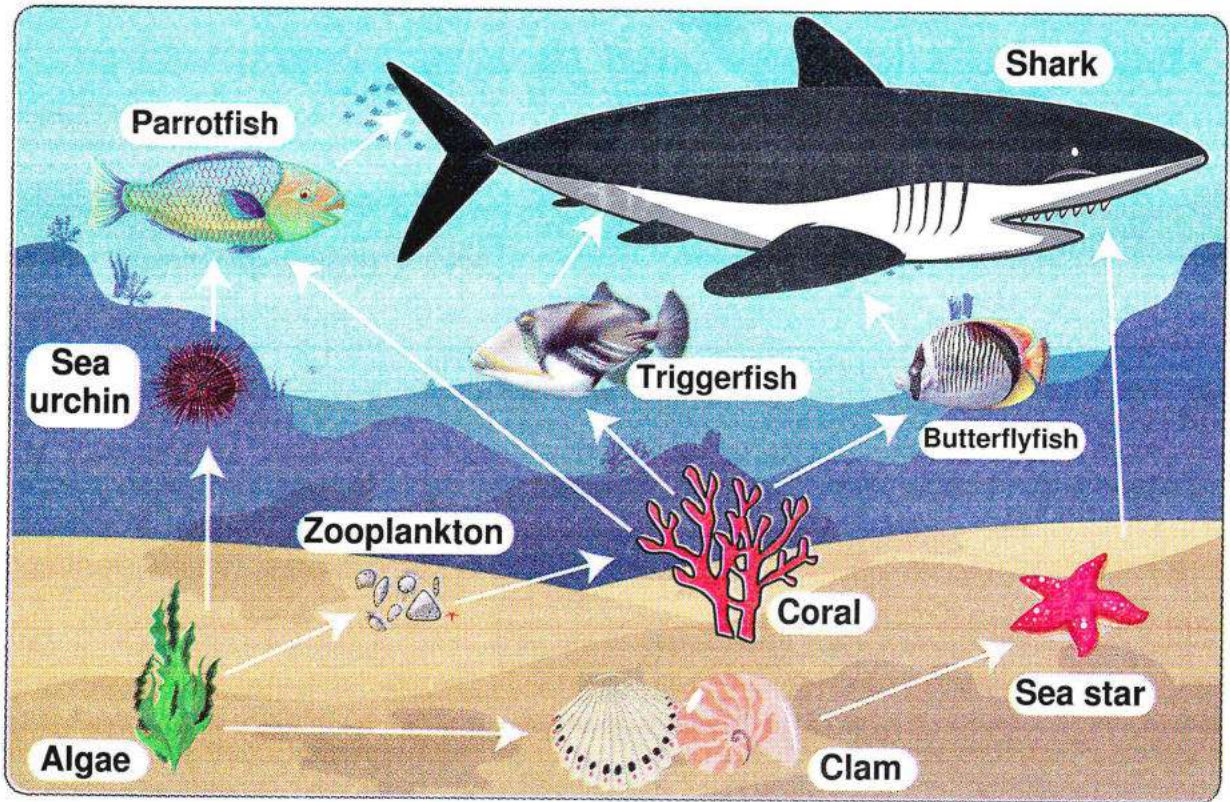
Top predators

They are consumers that exist at the top of the food chains.

Examples: Eagles, lions, sharks, crocodiles, ... etc.

Marine Food Webs

» Let's discover the role of each organism in this marine food web:



- **Algae** are producers that produce their own food.



- **Zooplanktons**, **clams**, and **sea urchins** are the primary consumers that feed on producers.



- **The sea stars** feeds on the clams.
- **The corals** feed on the zooplanktons.
- **The parrotfish** feed on the sea urchins or corals.
- **Butterflyfish** and **triggerfish** feed on corals.



- The **shark** is a top predator that eats butterflyfish, parrotfish, and sea stars.

Pony Exercises on

Lesson One

Answered

1 Choose the correct answer:

1. All the following factors pollute the water, except (Assiut 2023)

- (a) plastic garbage
- (b) animals' waste
- (c) sunlight
- (d) humans' waste

2. In extreme hot climate, the water of a lake (Assiut 2023)

- (a) decreases due to evaporation
- (b) increases due to evaporation
- (c) has a lower temperature
- (d) changes into ice

3. When there is a gentle rain in a desert ecosystem, this ecosystem may (Cairo 2023)

- (a) be improved
- (b) be destroyed
- (c) be harmed
- (d) not change

4. Heavy rain may the desert ecosystem.

- (a) benefit
- (b) improve
- (c) harm
- (d) restore

5. If the amount of grass in an ecosystem increases, this directly causes the increase in the number of (Cairo 2023)

- (a) hawks
- (b) rabbits
- (c) caracals
- (d) lions

6.  Algae are found in the of the marine food chain.

- (a) end
- (b) beginning
- (c) middle
- (d) last

7. The marine food web usually starts with (Menofia 2023 – Alex. 2023)

- (a) clams
- (b) zooplanktons
- (c) algae
- (d) parrotfish

8. Top predators are considered that feed on

- (a) consumers – decomposers
- (b) decomposers – decomposers
- (c) consumers – other consumers
- (d) consumers – producers

9. All the following are considered primary consumers in the marine food web, except

- (a) clams
- (b) zooplanktons
- (c) sea urchins
- (d) corals

10. _____ is a human activity that causes a decrease in the number of marine organisms.
 (a) Drought (b) Flooding (c) Overfishing (d) Gentle rain
11. In a marine food web, sea stars can't survive if _____ completely disappear.
 (a) sharks (b) clams (c) zooplanktons (d) corals
12. When the number of _____ and _____ increases, the number of corals decreases.
 (a) parrotfish – zooplanktons (b) zooplanktons – sea urchins
 (c) butterflyfish – triggerfish (d) clams – starfish
13. When corals feed on zooplanktons, corals are considered _____.
 (a) producers (b) primary consumers
 (c) secondary consumers (d) tertiary consumers
14. Which of the following represents a correct marine food chain?
 (a) Algae → Corals → Parrotfish → Sharks
 (b) Algae → Clams → Triggerfish
 (c) Algae → Sea urchins → Parrotfish → Sharks
 (d) Algae → Zooplanktons → Butterflyfish → Sharks

2 Put (✓) or (X):

1. Human activities don't affect the marine ecosystem. ()
2.  Heavy rain leads to a disruption in the desert ecosystem. ()
3. Overfishing affects the organisms living in a desert ecosystem. ()
4. It is preferable to recycle plastic waste rather than throw it in the ocean water. ()
5. Water pollution doesn't affect food chains in the ecosystem. ()
6. If the number of one species in an ecosystem increases, the food resources in this ecosystem decrease. ()
7. When a lake is exposed to an extreme hot climate for months, only producers may die. ()

(Minia 2023 - Alex. 2024)

8.  Human activities that occur on land affect the marine ecosystem. ()
9. Throwing plastic garbage in seawater positively affects the marine organisms. ()
10.  A food chain in the desert environment begins with algae. ()
11. Lions are top predators in a marine food web. ()
12.  An ecosystem is affected when decomposers disappear. ()
13. Corals are considered the producers in a marine food web. ()
14. The number of parrotfish increases by increasing the number of sharks in a marine ecosystem. ()
15.  The octopus is an example of a producer organism in the marine ecosystem. ()

3 Correct the underlined words:

1. Heavy rain causes drought in the ecosystem. (.....)
2. An ecosystem will be improved if there is a heavy rain. (.....)
3. Zooplanktons and clams are eaten by tertiary consumers. (.....)
4. Sharks are the top predators in a desert food web. (.....)
5. Clams feed on corals. (.....)
6. Overfishing impacts the desert ecosystem. (.....)
7. The drying up of lakes leads to a balance in the ecosystem. (.....)

4 Write the scientific term:

1. It is the harm that happens to the water due to human activities. (.....)
2. They are marine organisms that can make their own food by the photosynthesis process. (.....)
3. They are consumers that exist at the top of a food chain. (.....)
4. A human activity that decreases the population of marine organisms. (.....)

5 Complete the following sentences:

1.  Palau island needs to establish a to protect its water from pollution.
2. Throwing plastic garbage in a river causes water (Minia 2023)
3. When drought occurs in a lake, it causes in the ecosystem. (Assiut 2023)
4. If the number of tertiary consumers increases in an ecosystem, the number of secondary consumers
5.  Energy passes from to locusts in the desert environment.
6. When zooplanktons die, decompose them, recycling nutrients back to the ecosystem.

6 Cross out the odd word:

1. Zooplankton – Clam – Sea star – Sea urchin (Gharbia 2024) (.....)
2. Clam – Zooplankton – Algae – Sea urchin (Alex. 2023) (.....)
3. Sharks – Crocodiles – Tigers – Rabbits (.....)
4.  Sea urchins – Sharks – Algae – Parrotfish (.....)

7 Classify the following into producers or consumers:

(Qalyubia 2024)

1. Algae:
2. Zooplanktons:

8 Form a food chain by using the following organisms:

(Cairo 2023 & 2024)

Corals – Zooplanktons – Sharks – Algae – Parrotfish

.....

9 Complete the following sentences according to the food chains below:

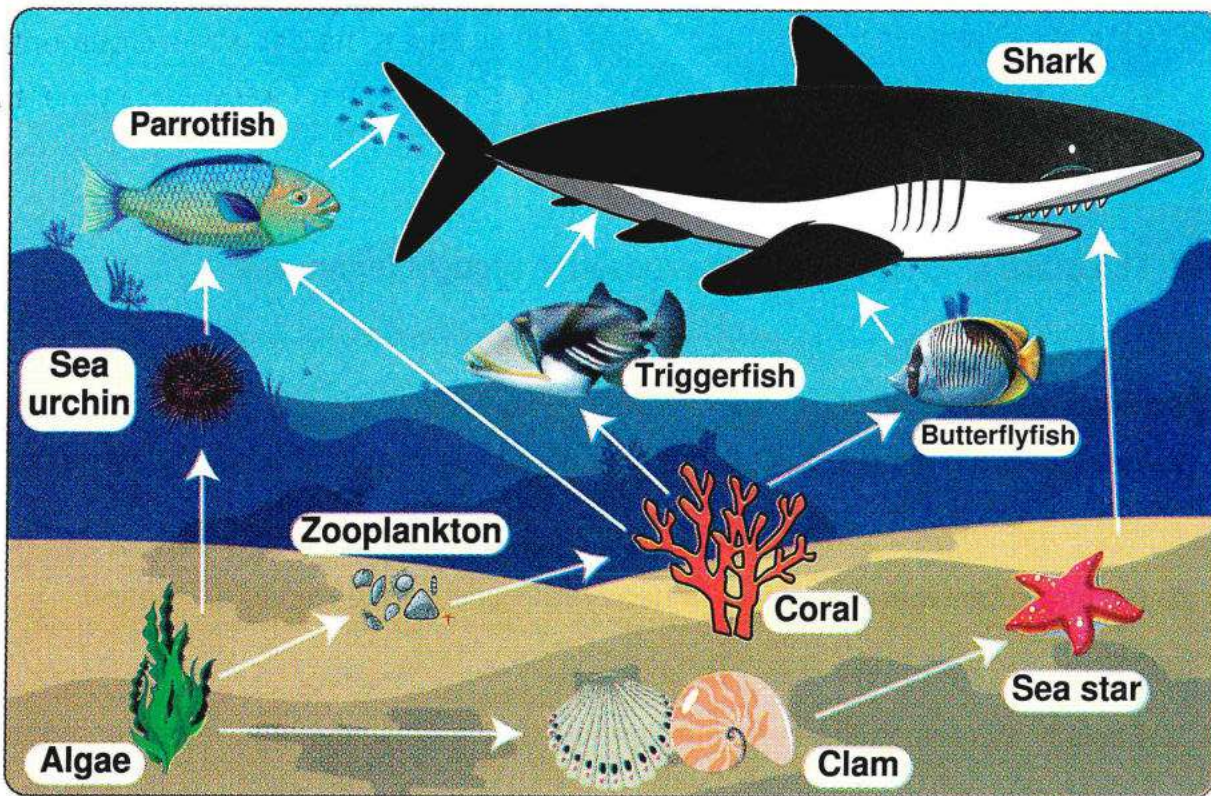
A Algae → Zooplankton → Shrimps → Crabs

1. Crabs are considered consumers.
2. When the number of shrimps increases, the number of decreases.

B Grasses → Rabbits → Owls

1. Due to drought conditions, can't make their own food.
2. When all rabbits die, move to another ecosystem.
3. The number of rabbits will decrease when the number of decrease or the number of increase.

10 Look at the following figure, then choose the correct answer:



1. This figure represents a
(food chain – food web)
2. are the producers.
(Corals – Algae)
3. Clams and sea urchins are consumers.
(primary – secondary)
4. If parrotfish disappear, the number of sea urchins
(increases – decreases)
5. The is the top predator.
(shark – sea star)

11 Give a reason for:

1. If the number of rabbits increases in a desert ecosystem, they all die.

2. Algae are considered producers.

12 What happens to:

1. The food resources if the number of one species increases in an ecosystem?

2. The sharks if all algae disappear from a certain marine food web?

3. The grass amount in a desert exposed to drought for months?

13 Various questions:

1. Mention two human activities that may negatively impact the marine ecosystem.

2. Compare between the effect of heavy rain and gentle rain in the desert.

3. Explain: increasing the number of one type of species can destroy an ecosystem.

4. Mention two ways applied by people in Palau to protect their marine environment.

5. Mention one example for each of the following:

a. A producer in the desert food web. (.....)

b. A producer in the marine food web. (.....)

c. A top predator in the marine food web. (.....)

d. A human activity that harms the marine environment. (.....)

Lesson

2

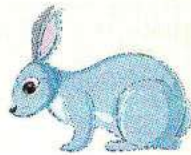
Changes in Food Webs

Activity 4 Energy Flow Body Model

» We will design a model for the flow of energy through a food chain.

Tools:

Four cards labeled with **grass**, **rabbit**, **snake** and **fungi**.



Steps:

- 1 Choose three of your classmates to play a **predator-prey game**.
- 2 Give each one of your classmates a card labeled with an organism.
- 3 Start the game as one of your friends represents the prey, he must give his card to another one who represents the predator.
- 4 Think about the flow of energy in this ecosystem.



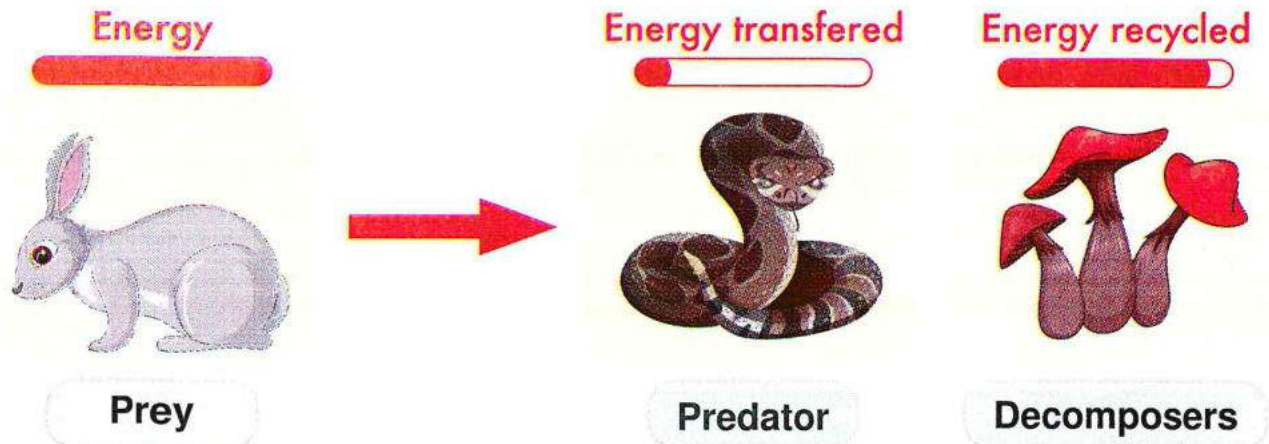
Observation:

- » When a predator feeds on prey, the energy is transferred from the prey to the predator.

Conclusions:

- » The energy in an ecosystem remains the same, although energy is transferred between living organisms.
- » Most of the energy is recycled by decomposers back into the ecosystem.

تظل الطاقة في النظام البيئي كما هي رغم أن الطاقة تنتقل بين الكائنات الحية.
معظم الطاقة يُعاد تدويرها إلى البيئة من خلال الكائنات المُحلِّلة.



Check your understanding?

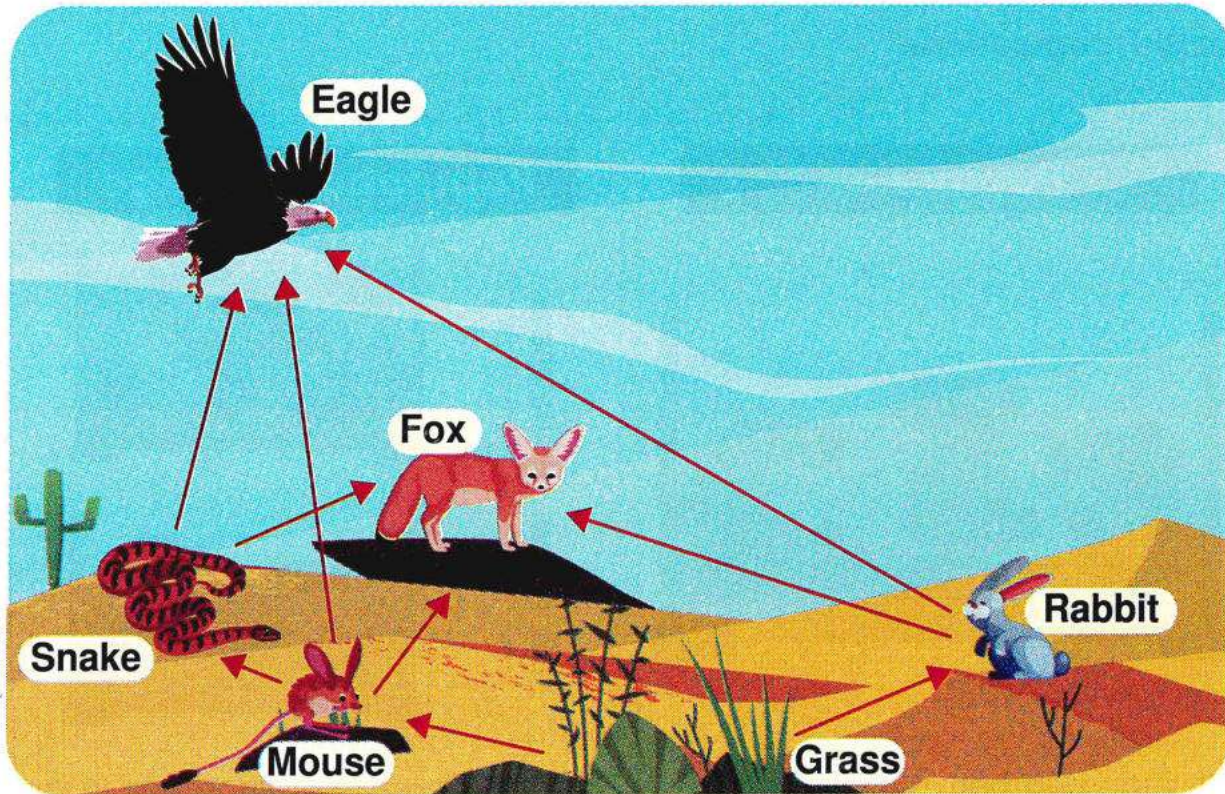
» Put (✓) or (x):

- The energy in an ecosystem decreases with the death of living organisms. ()
- In the food chain, energy transfers from the predator to the prey. ()

Activity 5 Desert Food Web

Concept 3

» Look at the following desert food web, then complete the sentences:



- 1 The and are top predators.
- 2 The is considered the only producer in this food web.
- 3 The snake is prey for the, and a predator for the
- 4 If all the grasses disappeared from this food web, the and would be the first organisms that die.

What happens to:

① The rabbits if the grass was removed from this food web?

- The rabbits would die because they can't find any food.

② The eagles if the grass was removed from this food web?

- In the beginning, the eagles wouldn't be affected.
- Over time, the eagles would be affected when the mice and the rabbits died due to lack (shortage) of food.

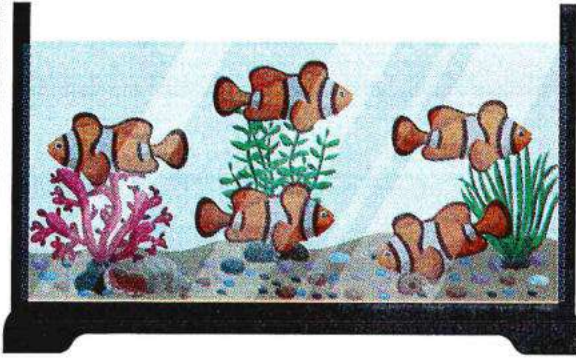
Activity 6 Population Changes

Unit 1

- » Living organisms of the same species can live in an ecosystem in groups called “**populations**”.

• تعيش الكائنات الحية من نفس النوع في النظام البيئي في مجموعات تُسمى «مجموعة الكائنات الحية».

Population



It is the **number** of organisms of one type of species in an area.

مجموعة الكائنات الحية:

هي أعداد نوع واحد من الكائنات الحية التي تعيش في منطقة ما.

Population Change

Increase



Decrease



It is the **increase** or **decrease** in the number of one species in an area.

التغير في أعداد الكائنات الحية:

هو النقص أو الزيادة في عدد نوع واحد من الكائنات الحية التي تعيش في منطقة ما.

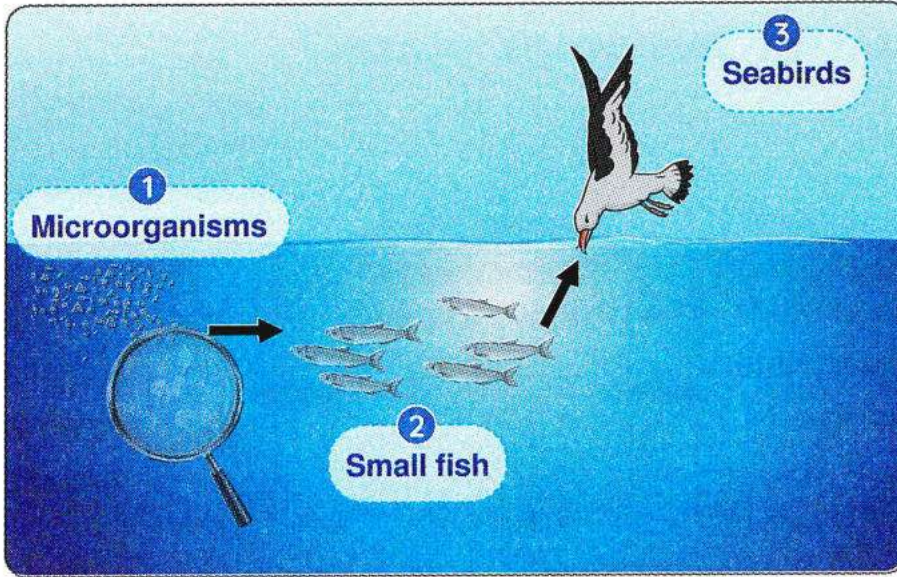
- » In an ecosystem, all species depend on each other to survive.
- » Any change in the population of one species affects the populations of other species.

• في النظام البيئي، تعتمد مجموعات الكائنات الحية على بعضها البعض: للبقاء على قيد الحياة.

• أي تغير يحدث في أعداد الكائنات الحية يؤثر على مجموعات الكائنات الحية الأخرى.

The Effect of Climate on the Marine Ecosystem

Look at the following marine food chain:



1 Microorganisms

- Microorganisms are **producers**, as they can make their own food.
- Microorganisms are tiny organisms that cannot be seen by the naked eye.
- Microorganisms need **cold water** to survive.

2 Small fish

- Small fish are **primary consumers**, as they feed on the microorganisms **floating** on the water surface.

3 Seabirds

- Seabirds build their nests on the **tops of mountains' cliffs**.
- Seabirds **dive deeply** into the sea to feed on the small fish.

الكائنات الدقيقة: • تعتبر الكائنات الدقيقة من الكائنات المنتجة التي تستطيع صنع غذائها بنفسها.

• الكائنات الدقيقة هي كائنات صغيرة جدًا لا ترى بالعين المجردة. • تعيش الكائنات الدقيقة في المياه الباردة.

الأسماك الصغيرة: • تعتبر الأسماك الصغيرة كائنات مستهلكة أولية تتغذى على الكائنات الدقيقة التي تطفو على سطح الماء.

الطيور البحرية: • تبني الطيور البحرية أعشاشها على قمة المنحدرات الجبلية. • تغوص الطيور البحرية لأسفل؛ لتتغذى على الأسماك الصغيرة.

What happens if:

The water becomes warm?



Microorganisms

move to another area, where water is **cooler**.

Small fish

move to **new habitats**.

Seabirds

have **no food**, so some may find new habitats, while others may die.

The climate change impacts the population of species, when:

The climate change is **suitable**, the population of a species **increases**.

The climate change is **unsuitable**, the population of species **decreases** because the organisms would die or move to another place.



Check your understanding?

» Put (✓) or (x):

- 1 Population change may happen due to climate change. ()
- 2 Small fish are the main source of food for seabirds. ()

Pony Exercises on

Lesson Two

Answered

1 Choose the correct answer:

1.  A food chain in the ocean begins with
☐ (a) small fish ☐ (b) microorganisms
☐ (c) sea turtles ☐ (d) grass
2. The is not included in a desert food web.
☐ (a) grass ☐ (b) hawk ☐ (c) rabbit ☐ (d) coral
3. Any increase or decrease in the number of organisms of one type of species is known as
☐ (a) an ecosystem ☐ (b) adaptation
☐ (c) climate change ☐ (d) population change
(Menofia 2024)
4. If the climate change is suitable, the population of a species
☐ (a) increases ☐ (b) decreases
☐ (c) dies ☐ (d) is not affected
(Beni Suef 2023)
5. play an important role in returning most of the energy to the ecosystem.
☐ (a) Producers ☐ (b) Decomposers
☐ (c) Consumers ☐ (d) Non-living things
6. The suitable habitat for microorganisms to survive is water.
☐ (a) hot ☐ (b) boiled ☐ (c) cold ☐ (d) warm
(Giza 2023 – Alex. 2024)
7. Small fish can feed on
☐ (a) sharks ☐ (b) seabirds ☐ (c) microorganisms ☐ (d) big fish
8. can make their own food.
☐ (a) Corals ☐ (b) Zooplanktons ☐ (c) Seabirds ☐ (d) Microorganisms
9. Small fish are considered when they feed on microorganisms.
☐ (a) producers ☐ (b) primary consumers
☐ (c) secondary consumers ☐ (d) tertiary consumers

2 Put (✓) or (X):

1. Most of the energy in a food web transfers between living organisms when an organism feeds on another. (Menofia 2023) ()
2. The population of a species in an ecosystem decreases when the climate change is not suitable. ()
3. A desert food web doesn't contain any type of fish. (Cairo 2024 – Giza 2023) ()
4. Microorganisms need warm water to survive. ()
5. Prey gain energy from feeding on predators. ()
6. A consumer may be a predator for some animals and prey for others at the same time. ()
7. Microorganisms are producers that small fish feed on to get energy. (Alex. 2023) ()
8. Seabirds feed directly on the microorganisms floating on the water surface. ()
9. Microorganisms can be seen by the naked eye. ()
10. If the temperature of sea water decreases, the microorganisms move to another place to survive. ()

3 Write the scientific term:

1. It is the number of organisms of one type of species living in an area. (Cairo 2023) (.....)
2. It is the increase or decrease in the number of organisms or species in an area. (.....)
3. They are organisms that recycle energy back into the ecosystem. (.....)
4. They are small organisms floating on the water surface and can make their own food. (.....)

4 Complete the following sentences:

1. Microorganisms are found in water habitats. (Gharbiya 2023)
2. are the producers in the marine food web. (Dakahlia 2023)
3. build their nests on the tops of mountains' cliffs. (Alex. 2023)
4. transfers between animals in the food web to help them survive.
5. If the climate change is suitable, the population of a species (Giza 2023)

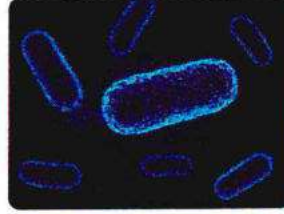
5 Look at the following figures, then answer the questions below:



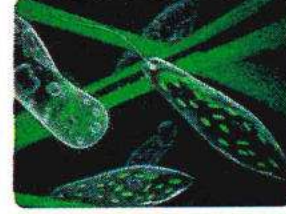
Small fish



Seabirds



Bacteria



Microorganisms

A Form a food chain by using the previous organisms.

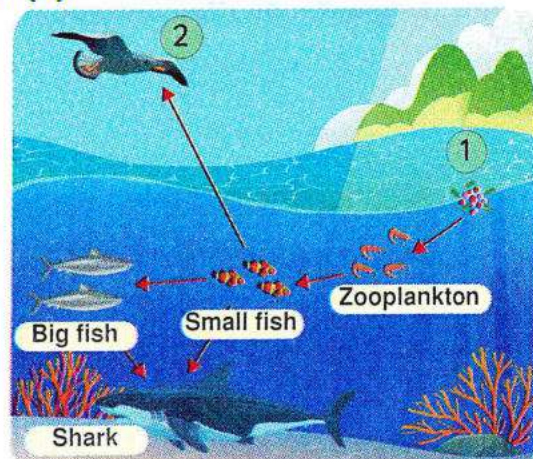
(Oalyubia 2023)

B Choose the correct answer:

- build their nests on the of a mountain cliff.
 (a) Small fish – top (b) Seabirds – bottom (c) Seabirds – top
- When seabirds die, return the energy in their bodies back into the ecosystem.
 (a) small fish (b) bacteria (c) algae
- Seabirds move to another habitat if
 (a) the sea water becomes warmer (b) there are many small fish
 (c) the temperature of sea water decreases

6 Look at the opposite figure, then put (✓) or (X):

- This figure represents a food chain. ()
- The organisms number 1 can make their own food. ()
- Small fish are considered secondary consumers. ()
- With the removal of big fish and sharks, the population of organism number 2 increases. ()



- If the water becomes warmer, this is the suitable climate change for increasing the population of organisms number 1. ()
- Shark is the only top predator in this marine environment. ()

7 Give a reason for:

1. Microorganisms are very important in the marine ecosystem. (Alex. 2023)
.....
2. Seabirds build their nests on mountains near to a cold water habitat. (Gharbia 2024)
.....

8 What happens if:

1. Climate change is unsuitable for a population of one type of species? (Cairo 2024)
.....
2. The seawater temperature increases? (According to microorganisms) (Cairo 2024)
.....

9 Various questions:

1. Imagine that grass disappears suddenly from a desert food web. What will happen to the consumers, such as rabbits and eagles, in this food web?
.....
.....
2. Explain: "Climate change may cause population change in an ecosystem."
.....
.....
3. Mention the suitable habitat for microorganisms. Then, mention the reason why microorganisms can't be seen by the naked eye.
.....
.....
4. Where do seabirds make their nests? And mention how they get their food.
.....
.....

Lesson

3

Changes in Food Webs

Activity 7 Habitat Loss

Concept 3

- » A healthy habitat provides living organisms with **clean air**, **food**, **water**, and **shelter** to survive.
- » Some human activities may destroy the habitats in an ecosystem.

Examples of human activities that change the habitats:

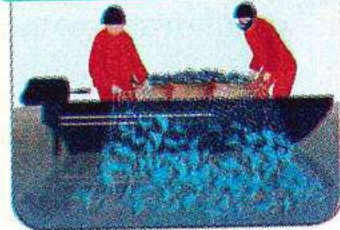
Adding buildings and roads



Throwing waste in water



Overfishing



- **Human activities** may cause **habitat loss** for many living organisms, which is one of the main reasons for **extinction**.

• قد تتسبب الأنشطة البشرية في فقدان الموطن للعديد من الكائنات الحية، وهو أحد الأسباب الرئيسية للانقراض.



NOTE:

- Human activities can also impact the weather and nonliving factors in an ecosystem, such as increasing the temperature of the water in some areas of the ocean.

• قد تؤثر الأنشطة البشرية في المناخ والعناصر غير الحية مثل ارتفاع درجة حرارة الماء في بعض المناطق في المحيط.

Coral Reefs

» Coral reefs are one of the most diverse and valuable **ecosystems** on Earth.

• تعد الشعاب المرجانية من أكثر الأنظمة البيئية تنوعًا وقيمة على الأرض.



NOTE:

• Corals are small marine animals that live in coral reefs ecosystems.

Importance of Coral Reefs

For many marine organisms



Coral reefs are considered ecosystems because they provide **food** and **shelter** for many marine organisms.

تعتبر الشعاب المرجانية نظامًا بيئيًا
حيث تعد الكائنات البحرية بالغذاء والمأوى.

For humans



Coral reefs are also important for tourism.

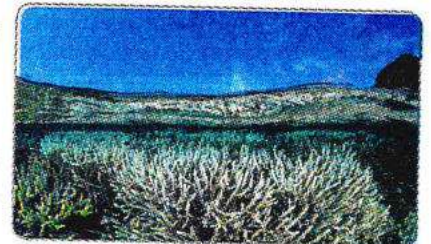
Tourists travel to coral reefs for fishing or diving, which increases the income of hotels and restaurants.

تعتبر الشعاب المرجانية أيضًا ذات أهمية كبيرة للسياحة: لأن السياح يسافرون إليها من أجل الصيد والغوص، مما يزيد من دخل الفنادق والمطاعم.

Example of a habitat loss: Coral bleaching

It is a condition in which coral reefs turn completely into **white** when the water's temperature **rises**.

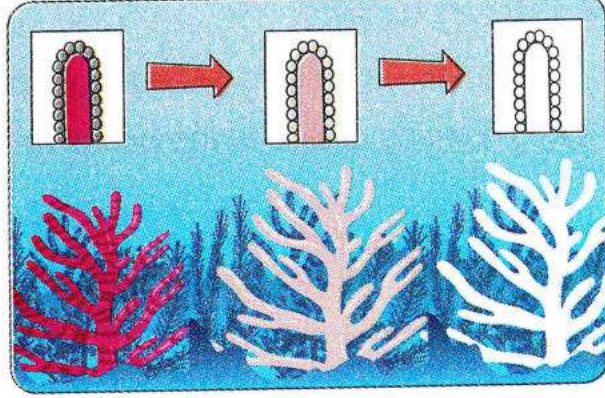
ظاهرة ابيضاض الشعاب المرجانية:
هي ظاهرة تحدث عند تغير لون الشعاب المرجانية تمامًا للون الأبيض عند ارتفاع درجة حرارة الماء.



How does coral bleaching happen?

When the water becomes too warm:

- ① Coral reefs get rid of the **algae** living in their tissues.
- ② This causes the coral reefs to turn completely into **white**.
- ③ As a result of coral bleaching, corals often do not survive.



عندما يكون الماء دافئاً جداً:

- ① تتخلص الشعاب المرجانية من الطحالب التي تعيش داخل أنسجتها.
- ② هذا يسبب تحول الشعاب المرجانية إلى اللون الأبيض تماماً.
- ③ ونتيجة لابيضاض الشعاب المرجانية، فإنها تتعرض للفناء.

Give a reason for:

- ① **Coral bleaching has negative impacts on the marine food web.**

Because many marine organisms may die or move to another habitat as they lose their food and shelter.

- ② **Coral bleaching has negative impacts on human communities.**

Because people who depend on coral reefs for tourism or fishing are negatively affected.



Check your understanding?

» Put (✓) or (x):

- ① Coral bleaching has a positive impact on marine organisms. ()
- ② Coral bleaching happens when seawater temperature decreases. ()

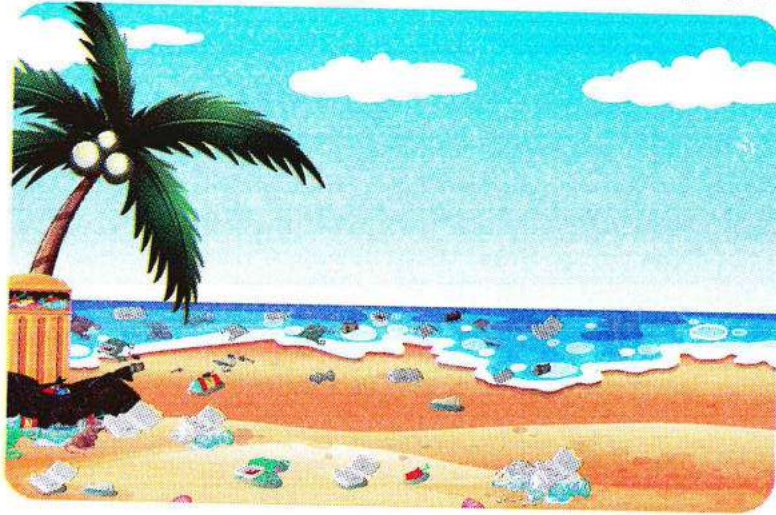
Activity 8 Plastic Pollution

Put (✓) or (X):

- 1 Marine organisms get energy from eating plastic products. ()
- 2 Throwing plastic in the ocean improves the marine ecosystem. ()

» Every year, large quantities of plastic are thrown from land into oceans, which pollute the marine environment and harm marine organisms.

• في كل عام يتم إلقاء كميات كبيرة من البلاستيك من اليابسة إلى المحيطات؛ مما يؤدي إلى تلويث البيئة البحرية والإضرار بالكائنات البحرية.



Microplastics

» Plastic products get broken down by the effect of **sunlight** into smaller pieces (smaller than a grain of rice) called "**microplastics**".



• تتكسر المنتجات البلاستيكية تحت تأثير أشعة الشمس إلى قطع أصغر (أصغر من حبة الأرز) تُسمى «الجسيمات البلاستيكية».

Give a reason for:

- Plastic has a bad effect on marine organisms.

Because plastic is **not nutritious**, and also it is **sharp** and **toxic**.

• المواد البلاستيكية لا تحتوي على أي قيمة غذائية، وأيضًا هي سامة وحادة.

The Effect of Plastic Pollution on Marine Life

- » Some marine organisms cannot often differentiate between real food and plastic, such as **whales**, **turtles**, **seabirds**, and **fish**.

• بعض الكائنات البحرية لا تستطيع معرفة الفرق بين طعامها الحقيقي وبين المواد البلاستيكية، مثل: الحيتان والسلاحف والطيور البحرية والأسماك.

Examples:

Sea Turtles

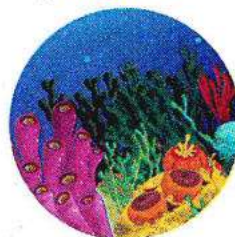
Sea turtles eat a lot of plastic pieces, thinking that they are **jellyfish**.



تأكل السلاحف البحرية المواد البلاستيكية؛ اعتقادًا منها أنها قنديل البحر.

Corals

Corals **filter** the seawater to get their food, so they **ingest** microplastics.



يقوم المرجان بتصفية ماء البحر: للحصول على طعامه؛ وبالتالي قد يبتلع المرجان الجسيمات البلاستيكية.

Some ways to reduce plastic pollution:

Using less plastic products.

Stop throwing plastic into the water.

Recycling plastic waste.

Check your understanding?

» Put (✓) or (x):

- 1 Marine organisms can get energy from eating plastic. ()
- 2 A sea turtle gets energy directly from eating jellyfish. ()

Pony Exercises on

Lesson Three

Answered

1 Choose the correct answer:

- Habitat loss causes of living organisms. (Cairo 2023)

☐ (a) reproduction	☐ (b) growth
☐ (c) extinction	☐ (d) increasing the population
- When marine habitats are destroyed, the number of living organisms in their food webs (Cairo 2024)

☐ (a) increases	☐ (b) decreases
☐ (c) does not change	☐ (d) doubles
- Coral reefs are considered (Alex. 2024)

☐ (a) algae	☐ (b) producers	☐ (c) ecosystems	☐ (d) bacteria
---------------------------------	-------------------------------------	--------------------------------------	------------------------------------
- If the temperature of seawater rises, leave the tissues of the coral reefs.

☐ (a) sharks	☐ (b) algae	☐ (c) lions	☐ (d) seabirds
----------------------------------	---------------------------------	---------------------------------	------------------------------------
- coral reefs have a large number of algae and other marine organisms.

☐ (a) White	☐ (b) Dead	☐ (c) Bleached	☐ (d) Healthy
---------------------------------	--------------------------------	------------------------------------	-----------------------------------
- Both sea turtles and are found in the same marine food chain. (Cairo 2023)

☐ (a) tigers	☐ (b) deers	☐ (c) jellyfish	☐ (d) eagles
----------------------------------	---------------------------------	-------------------------------------	----------------------------------
- When corals the seawater, they may ingest microplastics. (Minia 2023)

☐ (a) evaporate	☐ (b) filter	☐ (c) cool	☐ (d) warm
-------------------------------------	----------------------------------	--------------------------------	--------------------------------
- cause(s) water pollution and the marine organisms' population.

☐ (a) Overfishing – increasing	☐ (b) Plastic waste – decreasing
☐ (c) Plastic waste – increasing	☐ (d) Algae – decreasing

2 Put (✓) or (X):

1. Healthy habitats provide living organisms with clean air, healthy food, and water. (Beni Suef 2023) ()
2. Habitat loss is one of the main causes of extinction. (Alex. 2024) ()
3. Human activities can impact the temperature of seawater. ()
4. Coral bleaching happens when the temperature of seawater increases. (Alex. 2023) ()
5. When the temperature of seawater decreases, coral reefs receive more algae. (Alex. 2023) ()
6. If coral reefs are destroyed, many marine food chains will be destroyed. (Giza 2023) ()
7. Coral bleaching occurs due to throwing plastic in seawater. (Cairo 2023) ()
8. Coral bleaching has a positive impact on coral reefs. (Assiut 2023) ()
9. Marine organisms can't differentiate between plastic and their food. (Menoufia 2024) ()
10. Both jellyfish and sea turtles are consumers. (Alex. 2023) ()
11.  Plastic materials have a positive effect on marine organisms. ()
12. Recycling plastic contributes in preserving the ecosystem. ()

3 Correct the underlined words:

1. Coral bleaching occurs when the temperature of seawater decreases. (Dakahlia – Banha 2023) (.....)
2.  Increasing the water temperature causes coral reefs to turn into green. (.....)
3. A healthy desert habitat is necessary for the survival of sea turtles. (.....)
4. When the temperature of seawater decreases, coral reefs receive less algae. (.....)

4 Write the scientific term:

1.  It is the disappearance or death of all organisms of a species of marine organisms. (.....)
2. It is the most diverse marine ecosystem that provides food and shelter for many marine organisms. (.....)
3. It is a condition in which coral reefs turn completely into white.
(Menoufia 2024) (.....)
4. They are small pieces of plastic that could be ingested by coral reefs.
(.....)

5 Complete the following sentences:

1. cannot differentiate between a jellyfish and a piece of in the water. (Cairo 2023)
2. Habitat loss is a main cause of (Giza 2023)
3. The human activity that directly decreases the marine population is (Giza 2023)
4. Plastic waste materials are very harmful to marine organisms because they are and sharp. (Giza 2023)
5. Corals ingest when they the seawater.

6 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. Habitat loss	Ⓐ are consumers in the marine food web.
2. Microplastics	Ⓑ causes extinction of many species.
3. Coral reefs	Ⓒ harm corals when ingesting them.
4. Jellyfish	Ⓓ is a diverse ecosystem.

1. 2. 3. 4.

7 Give a reason for:

1. Plastic is very harmful to marine organisms.

(Gharbia 2023 – Cairo 2024)

2. Coral bleaching occurs when the seawater temperature rises.

(Gharbia 2023)

3. Habitat loss is harmful for many living organisms.

8 What happens to:

• Coral reefs when the seawater temperature rises?

(Cairo & Minia & Gharbiya 2023)

9 Various questions:

1. Mention two human activities that may cause habitat loss for many living organisms.

2. Mention the importance of coral reefs for marine organisms.

3. Mention one example for a marine organism that gets harmed by microplastics.

4. Mention two ways to reduce plastic pollution.

Lesson

4

Activity

9

Record Evidence Like a Scientist

Now you have learned about changes in food webs.
How can you describe protecting ecosystems now?



Question:

What might happen to a food web when an organism changes or the environment changes within an ecosystem?



My Claim:



Evidence:



Scientific Explanation with Reasoning:

Activity 10 Habitat Restoration

» Humans can either harm or help the plants and animals.

Habitat destruction has negative impacts on ecosystems.

G.R

Because it may lead to the extinction of some species.



Habitat restoration has positive impacts on ecosystems.

G.R

Because it can prevent species from extinction.



Concept 3

First Habitat Destruction

» Human activities, such as **eroding river banks**, may cause habitat destruction.

Humans erode river banks by removing many plants.



The wetland becomes drained.



Floods may reach farther places.

1 يتسبب الإنسان في تآكل ضفاف الأنهار عندما يقوم بإزالة كميات كبيرة من النباتات.

2 يؤدي ذلك إلى جفاف الأراضي الرطبة.

3 يؤدي ذلك لوصول مياه الفيضانات إلى أماكن أبعد.

Second Habitat Restoration

Once harm has been done to the environment, scientists, engineers, and citizens work on **habitat restoration**.

• بمجرد حدوث الضرر البيئي يعمل العلماء و المهندسون و المواطنون في عمليات الإصلاح.

Habitat restoration

It is a process of returning a habitat back to its natural state before harm was done.

عملية الإصلاح: هي عملية استعادة الموطن الطبيعي إلى ما كان عليه قبل وقوع الضرر.



» Restoration projects take **a lot of work** and a **long time**, but it has **positive results** and protects species from extinction.

Importance of Habitat Restoration



It works on repairing all parts of the habitat.

It works on restoring the resources of food, water, and shelter.



Examples of Habitat Restoration

Coral reef rehabilitation project in Arabian Gulf

Zero plastics project in coastal communities in Egypt

What happens when:

– A habitat is not restored?

Many species in this habitat may be lost, so their population decreases.



1 Coral Reef Rehabilitation Project In Arabian Gulf

- 1 Scientists harvest small parts of coral species.
- 2 Scientists move them to a "nursery".
- 3 In the nursery, small pieces of corals grow up healthy.
- 4 Scientists return the healthy coral pieces to the reefs where they were dying.
- 5 Healthy corals can continue growing and reproducing to make new coral reefs.



A **nursery** is an area in the sea or ocean where scientists take care of small pieces of coral.

المشتل هي منطقة في البحر أو المحيط حيث يقوم العلماء برعاية الأجزاء الصغيرة من الشعاب المرجانية حتى تنمو.

- 1 يجمع العلماء أجزاء صغيرة من مختلف الشعاب المرجانية.
- 2 يقومون العلماء بنقلها إلى المشتل.
- 3 في المشتل، تنمو الشعاب المرجانية بشكل صحي.
- 4 يتم إعادة الشعاب المرجانية المزدهرة إلى المكان المتضرر مرة أخرى.
- 5 يمكن للشعاب المرجانية السليمة بعد ذلك الاستمرار في النمو ولتكاثر.

2 Zero Plastics Project In coastal communities near the coral reefs in Egypt

- » In Egypt, coastal communities near coral reefs apply a new way of life called "**zero plastics**" by decreasing the use of one-use plastic products.

• في مصر، تطبق المجتمعات الساحلية القريبة من الشعاب المرجانية أسلوب حياة خال من البلاستيك وذلك من خلال تقليل استخدام المواد البلاستيكية التي تستخدم مرة واحدة.



No **Yes**

Check your understanding?

» Put (✓) or (x):

- 1 Restoration projects always have negative results. ()
- 2 "Zero plastics" means decreasing the use of plastic products to 0%. ()

Lesson Four

Answered

1 Choose the correct answer:

- is a process of returning the habitat back to its natural state.
 (a) Habitat loss (b) Habitat destruction
 (c) Habitat restoration (d) Reproduction
- Habitat restoration projects aim to
 (a) decrease food resources (b) repair a habitat
 (c) increase pollution (d) remove shelters
- When plants are removed from a wetland habitat, all the following occur in this habitat, except that
 (a) wetlands are drained (b) riverbanks are eroded
 (c) flooding impact decreases (d) flooding impact increases
- The area in which scientists take care of small pieces of corals until they grow up is called a (Cairo 2023)
 (a) grassland (b) nursery (c) food web (d) food chain

2 Put (✓) or (X):

- Removing plants negatively affects the consumers in an ecosystem. (Alex. 2023) ()
- Removing plants from riverbanks causes floods to be more dangerous. ()
- Applying restoration projects on habitats is better than keeping them healthy. ()
- Corals can be protected from bleaching by moving them into a nursery in a sea or an ocean. ()
- We must always use one-use plastic products to decrease plastic pollution. ()

3 Write the scientific term:

- A process of returning the habitat back to its natural state before the damage was done. (.....)
- An area in the sea where scientists take care of small pieces of corals until they grow up. (Luxor 2023) (.....)

3. A way of life that people in coastal communities in Egypt apply to reduce plastic pollution. (.....)

4 Complete the following sentences using the words below:

(100% – restoration – reefs – pollution – reducing – reproducing)

1. When the corals in a nursery grow up, they can be moved back to the to continue growing and
2. "Zero plastics" means decreasing the usage of plastic products in coastal communities by
3. Habitat prevents species from extinction by the negative impact of human activities, such as

5 Give a reason for:

1. The restoration process has positive effects on ecosystems.
.....
2. The nursery plays an important role in protecting corals from bleaching.
.....

6 What happens if:

- A habitat is not restored?
.....

7 Various questions:

1. Mention the importance of the habitat restoration process.
.....
.....
2. Mention one example of a marine habitat restoration.
.....
.....
3. Explain: "Removing many plants from river banks is dangerous for humans."
.....
.....

The background of the entire page is a photograph of a car accident. A silver car is shown from a high angle, tilted upwards, with its front end crushed. The car is surrounded by a large amount of white smoke or dust, suggesting a recent impact. The scene is set on a light-colored, possibly wet, surface.

Theme
Matter and Energy
2

Unit
2

Particles in Motion

Concept **1** Matter in the World Around Us

Concept **2** Describing and Measuring Matter

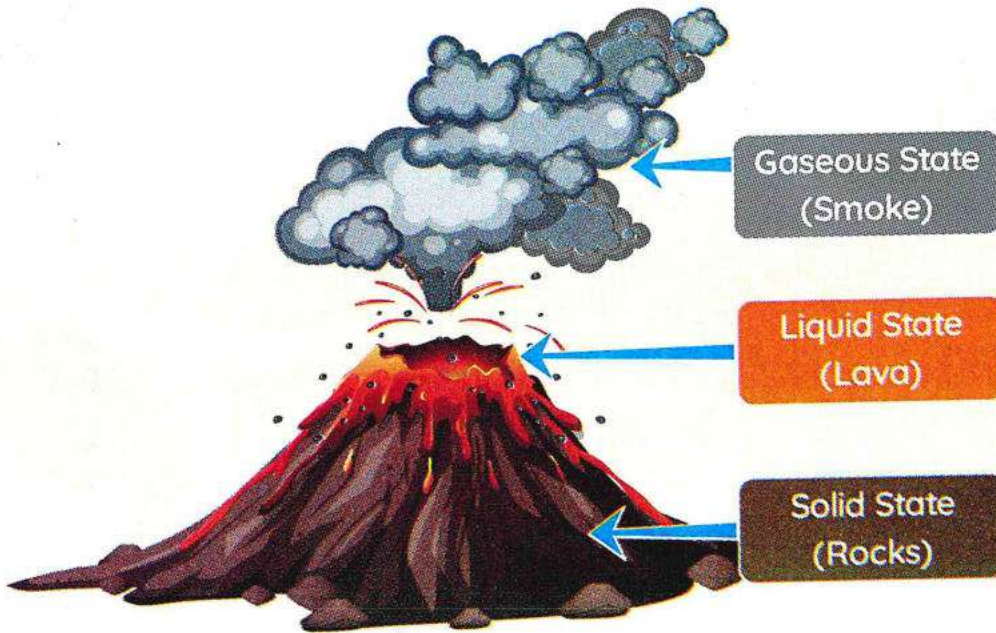
Concept **3** Comparing Changes in Matter

Get Started

What I Already Know

States of Matter

- » Matter exists in three states: **solid**, **liquid**, and **gas**.
- » The following figure represents the three states of matter during a **volcanic eruption**.



Hourglass

- It is a tool that holds sand in one compartment.
- People used it to track time in the past.



- » When the hourglass is set on one end, the sand runs from the top section into the bottom section.

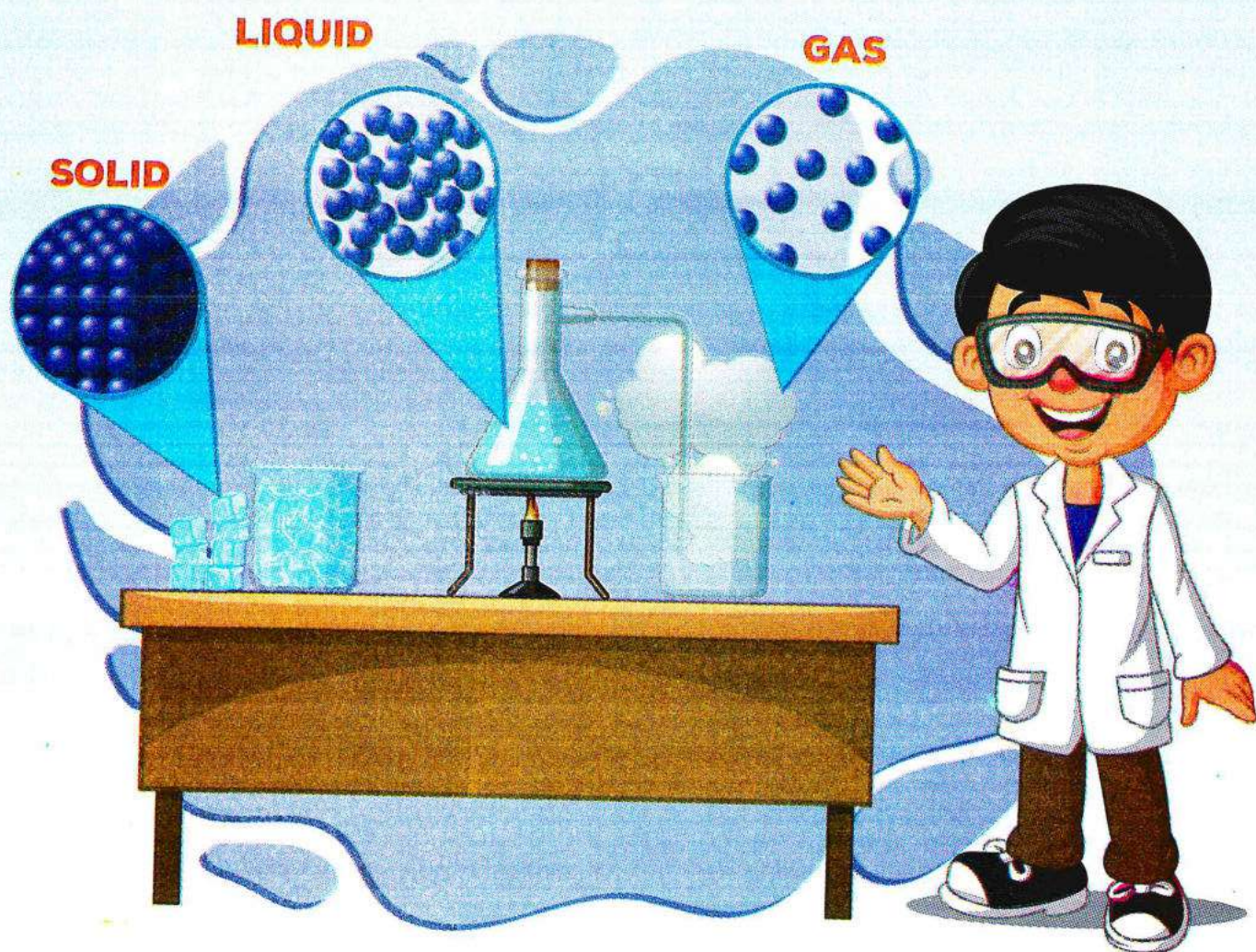
الساعة الرملية:

- هي أداة زجاجية تحمل الرمل في الجزء العلوي منها.
- هي أداة استخدمها الناس لتتبع الوقت في العصور القديمة.
- عند ضبط الساعة الرملية تتحرك الرمال من الجزء العلوي إلى الجزء السفلي.

Concept

2.1

Matter in the World Around Us



Concept

1

Matter in the World Around Us

Lesson 1

Activity 1 Can You Explain?

Activity 2 States of Water

Lesson 2

Activity 3 Observing Matter

Activity 4 Matter

Lesson 3

Activity 5 Particles of Matter

Activity 6 Modeling the Particles of Matter

Activity 7 Tiny Particle Size

Lesson 4

Activity 8 Models

Activity 9 Modeling States of Matter

Lesson 5

Activity 10 Record Evidence Like a Scientist

Activity 11 Careers and States of Matter

Glossary

Lesson (1)

Activity (1)

Matter	مادة	Solid state	حالة صلبة	Mass	كتلة	Taste	طعم
Gas state	حالة غازية	States	حالات	Temperature	درجة الحرارة	Shape	شكل
Liquid state	حالة سائلة	Volume	الحجم	Texture	لمس	Space	حيز

Activity (2)

Ice cube	مكعب ثلج	Sand	رمال	Oil	زيت	Juice	عصير
Water vapor	بخار الماء	Feather	ريشة	Gasoline	بنزين	Vinegar	خل

Lesson (2)

Activity (3)

Fixed shape	شكل ثابت	Invisible	غير مرئي	Indefinite	غير محدد	Definite	محدد
Container	وعاء	Blow	ينفخ				

Activity (4)

Feel	يشعر	Measuring tape	الشريط المترى	Move freely	تتحرك بحرية	Germ	جراثيم
Thermometer	الترمومتر	Freezing	عملية التجمد	Molecules	جزيئات	Smell	يشم
Packed tightly	متراصة بإحكام	Spaces	مسافات	Particles	جسيمات	Balance (scale)	الميزان
Melting	عملية الانصهار						

Lesson (3)

Activity (5)

Building unit	وحدة بناء	Direction	اتجاه	Spread out	تنتشر	Held	متراصة
Arrangement	ترتيب	Fill	تملا	Slide	تنزلق	Vibrate	تهتز

Activity (6)

Sunny day	يوم مشمس	Separate	تتفصل	Three dimensional units	وحدات ثلاثية الأبعاد	Models	النماذج
Heat up	تسخن	Movement	حركة				

Activity (7)

Blood cells	كرات الدم الحمراء	Round shape	شكل دائري	Electron microscope	الميكروسكوب الإلكتروني	Normal microscope	الميكروسكوب العادي
Bounce	ترتد	Force	قوة	Type	نوع	Magnifying lens	عدسة مكبرة
Squeeze	يضغط	Average	متوسط	Pop	ينفجر	Escape	يهرب
Tiny	صغيرة جدًا	Connect	تتصل	Exert	يبدل	Powerful	قوي

Lesson (4)

Activity (8)

Model	نموذج	Closest	الأقرب	Solar system	النظام الشمسي	Real size	حجم حقيقي
Eruption	ثوران	Location	موقع	Globe	مجسم الكرة الأرضية	Work	يعمل
Volcano	بركان	Countries	بلاد	Right size	حجم مناسب	Fly	تطير
Compare	يقارن	Oceans	محيطات				

Activity (9)

Organized	منظمة	Random	عشوائي	Regular	منتظم	Pattern	نمط
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Lesson (5)

Activity (10)

Chef	طباخ	Freezing	التجمد	Aroma	رائحة الطعام	Vegetables	خضراوات
Delicious dishes	أطباق شهية	Boiling	الغليان	Pasta	معكرونة	Rice	أرز

Activity 1 Can You Explain?

- Everything around us is made of **matter**.
- To describe any matter, you should study its properties, such as **color, shape, taste, texture, temperature, mass, volume, ...etc.**

كل شيء حولنا يتكوّن من مادة.
لوصف المادة، لا بُدّ أن تقوم بدراسة خصائصها مثل: اللون والشكل والطعم واللمس ودرجة الحرارة والكتلة والحجم... إلخ.

Matter is found in three different states (forms):

Solid



Ice

Liquid



Milk

Gas



Steam

- Matter can be defined as follows:

Matter

It is anything that has **mass** and **volume** (takes up space).

المادة: هي كل ما له كتلة وحجم (يشغل حيّزًا من الفراغ).

Example to differentiate between mass and volume:

Tennis ball is bigger in mass.



Balloon is bigger in volume.
(or takes up more space)

Volume is the amount of space that matter takes up.

Activity 2 States of Water

Water can be found in **three** different states (forms):

Solid State
ice



Liquid State
water



Gas State
steam



» The previous figures represent the **same matter** found in **three different states**.

Give a reason for:

① **Air is considered as matter.**

- Because air has a mass and a volume.

② **Water has a volume.**

- Because water takes up space.



NOTE:

- Water can change from one state to another.



Check your understanding?

» **Classify the following matter in the table below:**

(Juice – Steam – Oil – Oxygen – Sand – Water – Wood – Carbon dioxide – Iron – Gold – Plastic – Glass – Gasoline – Sugar – Vinegar – Air)

Solids	Liquids	Gases

Pony Exercises on

Lesson One

Answered

1 Choose the correct answer:

1. Matter is found in states. (Helwan 2024)
☐ (a) two ☐ (b) three ☐ (c) four ☐ (d) seven
2. Anything that has a mass and occupies space is called
☐ (a) energy ☐ (b) force ☐ (c) matter ☐ (d) weight
3. is the solid state of water. (Cairo 2024)
☐ (a) Water ☐ (b) Ice ☐ (c) Steam ☐ (d) Water vapor
4. Wood takes up a space, so it has a
☐ (a) mass ☐ (b) length ☐ (c) weight ☐ (d) volume
5. is an example of a gas. (Giza 2023)
☐ (a) Chocolate ☐ (b) A rock ☐ (c) A pencil ☐ (d) Oxygen
6. All the following are examples of a solid state, except
☐ (a) sand ☐ (b) ice ☐ (c) oil ☐ (d) rock
7. All the following substances are liquids, except (Cairo 2023)
☐ (a) vinegar ☐ (b) stone ☐ (c) milk ☐ (d) oil
8.  Pens and rulers are examples of matter.
☐ (a) a solid ☐ (b) a liquid ☐ (c) a gaseous ☐ (d) all the previous
9. Both of oil and ice
☐ (a) are solid states of matter ☐ (b) are liquid states of matter
☐ (c) are examples of gases ☐ (d) have a mass and a volume

2 Put (✓) or (X):

1. Water is found in three different states. ()
2. Ice and gold are examples of solid states of matter. (Cairo 2023) ()
3. Ice is considered as the solid state of water. (Alex. 2024) ()
4. Matter is anything that has a volume only. ()
5. A rock is considered as a liquid state of matter. ()
6.  The same substance can exist in nature in more than one state. ()
7. Steam released from a hot cup of tea is an example of a liquid matter. ()

3 Correct the underlined words:

1. Water vapor is considered an example of a solid matter. (Damietta 2023) (.....)
2. Wood is considered an example of a liquid matter. (.....)
3. Steam is a liquid state of water. (.....)
4. Matter is anything that has a mass and weight. (.....)

4 Write the scientific term:

1. Anything that has a mass and takes up a space. (Cairo 2024) (.....)
2. It is the amount of space occupied by matter. (.....)

5 Complete the following sentences:

1. Iron and gold are examples of a state of matter. (Dakahlia 2024)
2. is an example of a liquid matter. (Cairo 2023)
3. Water is the matter in the state, while water vapor is the matter in the state. (Menofia 2023)
4. Anything has a mass and takes up space is called (Minia 2023)
5. Any matter takes up a space means that it has (Minia 2023)

6 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. Oxygen	(a) is a solid matter.
2. Oil	(b) is a liquid matter.
3. Ice	(c) doesn't have a volume.
	(d) is a gas matter. (Helwan 2024)

1. 2. 3.

7 Cross out the odd word:

1. Wood – Iron – Oxygen – Plastic (Giza 2023) (.....)
2. Coal – Air – Oxygen – Carbon dioxide (Demietta 2023) (.....)
3. Milk – Wood – Oil – Water (Beni Suef 2023) (.....)

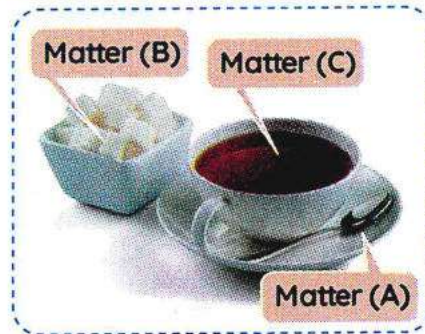
8 Mention the state of each of the following matters:

Oil – Book – Water vapor – Table – Ruler – Helium – Vinegar.

Concept 1

9 Look at the following figure, then choose the correct answer:

- Both matter (A) and matter (B) represent examples of
 (a) liquids (b) solids (c) gases
- Matter (C) is considered as a matter.
 (a) liquid (b) solid (c) gas
- Which state of matter doesn't exist in this figure?
 (a) Liquid (b) Solid (c) Gas



10 Give a reason for:

- The book is a matter.

(Damietta 2023)

11 What happens to ?

- The state of water when it is boiled.

12 Mention on example for each of the following:

- Gas matter.
- Liquid matter.
- Solid matter.

13 Define each of the following:

- Matter
.....
- Volume
.....

Lesson

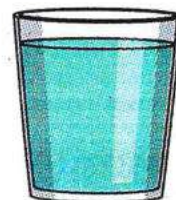
2

Activity 3 Observing Matter

» Put (✓) or (x):

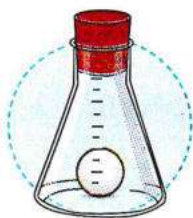
1 Water takes the shape of the cup. ()

2 The ice cube has a fixed shape. ()

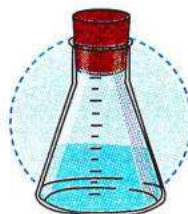


» In this experiment, we will describe different states of matter.

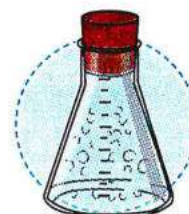
Tools:



Container (A)
(contains a ball)



Container (B)
(contains water)



Container (C)
(contains steam)

Steps:

① Observe the properties of matter in the three containers.

② Record your observations in the following table:

Matter	State	Shape	Volume
The Ball in Container (A)	Solid	Definite	Definite
Water in Container (B)	Liquid	No definite (indefinite)	Definite
Steam in Container (C)	Gas	No definite (indefinite)	No definite (indefinite)

Conclusions:

- » **Solids** have fixed (definite) shapes and volumes.
- » **Liquids** have a definite volume but indefinite shape.
- » **Gases** have variable (indefinite) shape or volume.

From the previous experiment, we can observe that:

Solids

The shape of solids doesn't change until something happens to change it.

Liquids

Liquids take the shape of the container they are poured in.

Gases

Gases completely fill their container and take their shapes.

NOTE:

- Most gases, like air, are **invisible**, but
 - We can see the wind blowing objects around.
 - We can see a balloon getting larger when we blow air into it.

**Check your understanding?**

» Put (✓) or (x)

- 1 Both liquids and solids have definite volumes. ()
- 2 Liquids and solids have definite shapes. ()
- 3 Air is not a matter because we can't see it. ()

Activity 4 Matter

» We have learned that:

Matter is anything that has a mass and takes up space.

Examples of matter around us:



» Matter is something that we can **feel**, **see**, or **smell**.

» Some matters are too small to be seen with the human eye, like **air** and **germs**.



المادة هي شيء من الممكن أن نشعر به أو نراه أو نستطيع شمّه.
هناك بعض المواد أصغر من أن تلاحظها أعين الإنسان، مثل: الهواء والجراثيم.

NOTES:

- **Light**, **sound**, and **heat** are not matters but they are forms of energy.
- Two matters can not take up the same space at the same time.

لا يعتبر الضوء والصوت والحرارة مادة، ولكنها أنواع مختلفة من الطاقة.
لا يشغل جسمان نفس الحيز في نفس الوقت.

What is Matter Actually Made of?

- Any matter consists of tiny **particles (molecules)** that we can't see with our naked eye.
- Particles of matter are in a continuous motion.

• تتكوّن المادة من جسيمات صغيرة جدًا؛ حيث لا نستطيع رؤيتها بالعين المجردة.
• جسيمات المادة في حالة حركة مستمرة.

Comparing States of Matter

	Solids	Liquids	Gases
Shape of Particles			
Spaces Between Particles	• They are very close to each other (packed tightly).	• They have more spaces .	• They have a lot of spaces .
Energy of Particles	• They have less energy.	• They have more energy.	• They have a lot of energy.
Motion of Particles	• They move only a little bit .	• They move more freely .	• They move very freely .

How much the particles are moving

determines

the state of matter.

Measuring Matter

We can measure **length** of some matter using:

Ruler



Measuring tape
(Tape measure)



We can measure **Mass** of some matter using:

Balance (scale)



We can measure **Temperature** of some matter using:

Thermometer



Observing Matter



We can observe air filling up a balloon.

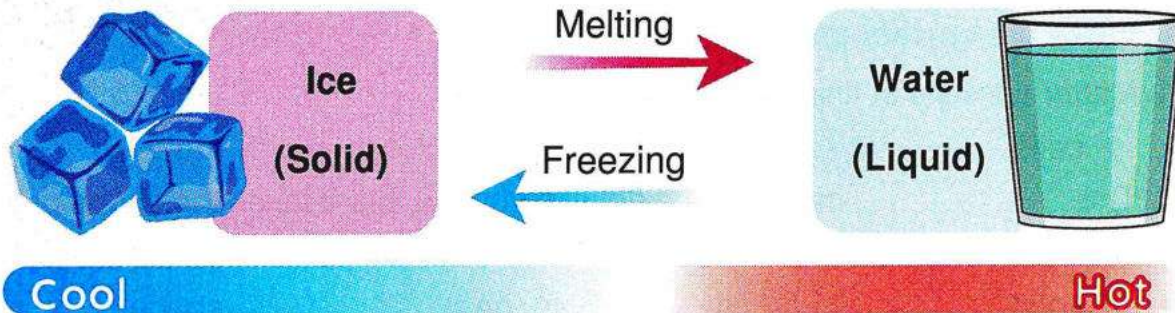
يمكنك ملاحظة الهواء الذي يملأ البالون.



We can observe milk being poured into a glass cup.

يمكنك ملاحظة صب الحليب في كوب زجاجي.

Matter changes from one state to another, such as:



• يمكن للمادة أن تتغير من حالة لأخرى بمرور الوقت، مثل:

- انصهار الثلج إلى الماء.

- تجمد الماء إلى الثلج.



Check your understanding?

» Complete the following sentences using the words between the two brackets:

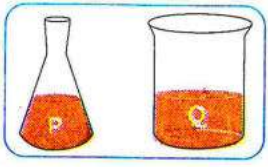
(particles – freezing – Solids – melting – motion – Gases – Liquids)

- 1 are poured and they take the shape of their containers.
- 2 keep their shape when transferring them from one container to another.
- 3 completely fill a closed container, and take its shape.
- 4 Ice changes to water through process.
- 5 Water changes to ice through process.
- 6 Matter consists of tiny that are in a continuous

Pony Exercises on Lesson Two

Answered

1 Choose the correct answer:

1. Matter consists of tiny moving (Banha 2023)
(a) cells (b) proteins (c) particles (d) muscles
 2. The matter has a definite volume, but it takes the shape of the container. (Alex. 2024)
(a) solid (b) liquid (c) gas (d) space
 3. take the shape of the container in which they are placed. (Dakahlia 2024)
(a) Solids and liquids (b) Solids and gases
(c) Liquids and gases (d) Gases only
 4.  When the oil is transferred from the container "P" to "Q" as shown in the opposite figure, which of the following undergoes change? (Qalyubia 2024)
(a) Oil's volume (b) Oil's mass (c) Oil's shape (d) Oil's color
- 
5. Particles of are very close to each other. (Cairo 2023)
(a) oxygen (b) steam (c) milk (d) gold
 6. Both and take the shape of their container. (Alex. 2024)
(a) air – plastic (b) water – oil (c) wood – air (d) water – plastic
 7. Particles of a piece of iron
(a) move very fast (b) have great energy
(c) have low energy (d) move very freely
 8. Oil takes the of its container. (Cairo 2023)
(a) volume (b) shape (c) color (d) mass
 9. The movement of particles of water are slower than that of (Alex. 2023)
(a) wood (b) plastic (c) air (d) gold
 10. Both and have definite shape and volume. (Assuit 2024)
(a) wood – oxygen (b) milk – iron
(c) wood – iron (d) milk – oxygen
 11. Particles of vinegar move faster than the particles of
(a) wood (b) steam (c) oxygen (d) air

12. We can measure the mass of a cube of ice by using a

- (a) thermometer (b) ruler
(c) measuring tape (d) balance

(Al-Azhar 2024)

2 Put (✓) or (X):

1. Matter is made up of tiny particles. (Cairo 2023) ()
2. Liquid particles move faster than solid particles. (Giza 2023, Cairo 2024) ()
3. Light and sound are forms of matter. (Damietta 2023, Cairo 2024) ()
4. Liquid matter has a definite volume and a definite shape. (Dakahlia 2024) ()
5. Gases have no volume. ()
6. The particles of wood are packed tightly together. ()
7. Both gold and milk have definite shape. (Sohag 2024) ()
8. The mass of matter is measured by a thermometer. (Helwan 2024) ()
9. Gases don't have a definite shape or volume. (Alex. 2023) ()
10. Measuring tape is used to measure the length of objects. (Banha 2023) ()
11. Matter changes from one form to another. ()
12. Particles of wood don't move at all. ()

3 Correct the underlined words:

1. Water takes the volume of its container. (.....)
2. The solid matter has a definite volume and takes the shape of the container. (Alex. 2023) (.....)
3. The solid matter completely fills the container in which it exists. (.....)
4. Particles of solids move faster than particles of liquids. (.....)
5. Particles of water move more freely than particles of water vapor. (.....)

4 Write the scientific term:

1. A state of matter that has a fixed volume and shape. (Menofya 2024) (.....)
2. The substances that have definite volume and take the shape of their containers. (Alex. 2023) (.....)

3. A state of matter whose particles have the least amount of energy. (.....)
4. A state of matter that have freely moving particles. (.....)
5. A state of matter that has a lot of spaces between its particles. (.....)
6. A state of matter that has no definite shape and volume. (.....)
7. A tool used to measure the length of a wall. (Cairo 2023, Gharbia, Alex. 2024) (.....)
8. A tool used to measure the temperature of hot milk. (.....)

5 Complete the following sentences:

1. Oil takes the of its container. (Cario, Ismailia 2023)
2. Particles of are very close to each other. (Sohag 2024)
3. Particles of have a lot of energy and spaces. (Sohag 2024)
4. The state of matter that has a definite volume, but it doesn't have a definite shape is the state. (Beni Suef 2023)
5. Any matter is made up of tiny (Alex. 2024)
6. A thermometer is used to measure the of matter. (Alex. 2023)

6 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. Oil	Ⓐ has particles that are very close to each other.
2. Oxygen	Ⓑ has particles move very freely.
3. Glass	Ⓒ has an indefinite shape and a definite volume.

1. 2. 3.

7 Cross out the odd word:

1. Water – Air – Light – Wood (.....)

8 Look at the following figures, then choose the correct answer:

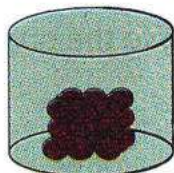


Figure (1)

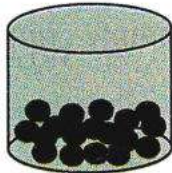


Figure (2)

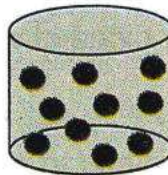


Figure (3)

- Particles in figure (2) move those in figure (1).
 (a) slower than (b) faster than (c) at the same speed of
- Particles in figure (1) have energy.
 (a) the least (b) the greatest (c) no
- Particles in figure (2) represent the particles of
 (a) wood (b) air (c) water
- Particles in figure (3) have
 (a) the least energy
 (b) a lot of spaces between each other
 (c) no spaces between each other

9 Give a reason for:

1. Air is a gaseous matter.

.....

2. Water is a liquid matter.

[Alex. 2023]

.....

3. Iron and wood are solid matters.

[Cairo 2023]

.....

4. Oxygen has no definite shape or volume.

[Gharbiya 2023]

.....

5. Particles of water vapor move more freely than particles of water.

.....

10 What happens if:

1. You put a piece of wood in an empty cup? (According to the shape of wood)

2. You pour water in a container? (According to the shape of water)

11 Mention the suitable device that can be used to measure the following properties of matter:

a. The mass of a liquid.

b. The length of a table.

c. The temperature of the human body.

d. The length of your book.

12 Compare between each of the following:

P.O.C	Solid state	Liquid state	Gas State
Shape			
Volume			
Example			

Activity 5 Particles of Matter

» Matter consists of tiny **particles** that are in a continuous motion.

Particles

They are building units of matter.

الجسيمات: هي وحدات بناء المادة.

» Different matters are made of different particles; **for example**, particles of wood are different from particles of gold.

• تتكوّن المواد المختلفة من جسيمات مختلفة (على سبيل المثال: فإن الجسيمات داخل الخشب مختلفة تمامًا عن الجسيمات داخل الذهب).

States of matter depend on the **arrangement** of particles in a substance, where:

1 Particles of solids:

» They are packed (held) closely together.

» Solids keep their shape because:

- Their particles **vibrate** around their places without moving.
- Their particles do not move separately from each other.
- Their particles do not slide over each other, so they can't take the shape of their containers.



الجسيمات مترابطة وقرينة من بعضها (متماسكة معًا):

• تحافظ المادة الصلبة على شكلها:

— لأن الجسيمات لا تتحرك منفصلة. — لأن الجسيمات تهتز في موضعها ولا تغير أماكنها. — لأن الجسيمات لا تنزلق على بعضها البعض.

2 Particles of liquids:

» They are held together more loosely than particles of solids, so:

- They move **faster than** the particles of solids.
- Liquids take the shape of their container. **GR**

Because they can move and slide over each other.



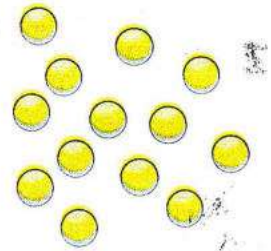
ترتبط جسيماتها بروابط أقل من الحالة الصلبة؛ لذلك:

- تتحرك الجسيمات في الحالة السائلة أسرع من جسيمات الحالة الصلبة.
- تتخذ السوائل شكل الإناء الذي توضع فيه.
- تستطيع الجسيمات الحركة والابتعاد عن بعضها.

3 Particles of gases:

» Their particles are not held together, so:

- The particles move very quickly in all directions.
- The particles spread out to fill up any container they are put in.



تتكوّن من جسيمات غير متماسكة:

- تتحرك الجسيمات في الحالة الغازية بسرعة في جميع الاتجاهات.
- تنتشر لتملأ أي إناء توضع فيه.

What happens if:

① Water changes into steam (according to the speed of particles)?

- The speed of particles increases.

② Water changes into ice (according to the speed of particles)?

- The speed of particles decreases.



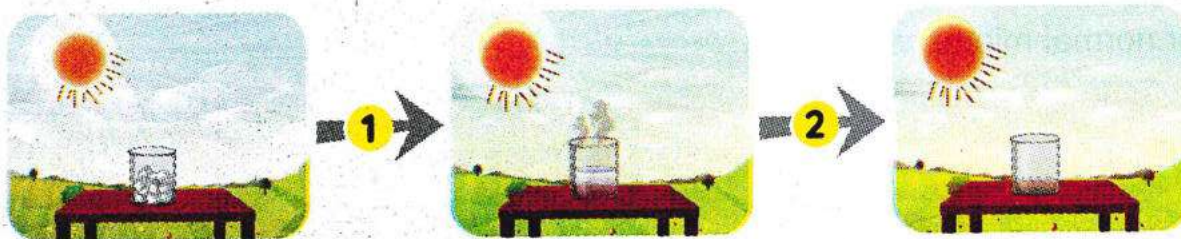
Check your understanding?

» Put (✓) or (x)

- 1 Solids have a fixed shape and volume. ()
- 2 Water particles are similar to milk particles. ()

Activity 6 Modeling the Particles of Matter

When You Leave Ice Cubes on the Table on a Hot Sunny Day:



1 The sun heats up the particles of ice cubes, so they move faster and the **ice** cubes changes into **water**.

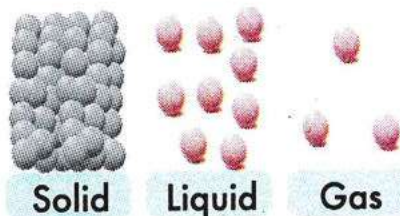
2 The sun heats up the particles in water, so they move faster and the **water** changes into **water vapor**.



- The state of matter changes by changing its temperature.

The Importance of Using Models

- We can use **ping pong balls** to make a model that represents the particles of the three states of matter.
- Ping pong balls are **three-dimensional units (3D)** so they can be separated from each other.



This model can be used to show:

The movement of the particles.

The spaces between the particles.

➤ Model is a way to study scientific concepts and make ideas easier.

Activity 7 Tiny Particles Size

» Particles are extremely tiny, so they can't be detected by magnifying lenses or normal microscopes.

• الجسيمات صغيرة للغاية؛ حيث لا تستطيع العدسات المكبرة أو المجاهر العادية اكتشافها.

The Size of Particles depends on

The type of particles.

How are particles connected together?



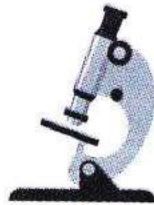
One hair

- The average size of a particle is so tiny, where:
One hair is about **150,000** to **300,000** particles thick.

- يعتمد الحجم الفعلي للجسيم على: نوع الجسيم، وكيفية ارتباط الجسيمات معًا.
- أحجام الجسيمات تكون متناهية الصغر.
- الشعرة الواحدة = ما يعادل 150.000 إلى 300.000 جسيم.

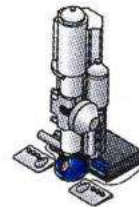
How Can We See Each Particle?

Normal microscope



Scientists don't use it to see tiny particles because it is not powerful enough.

Electron microscope



Scientists use it to see one tiny particle, such as one blood cell.

- لا يستخدم العلماء المجاهر العادية لرؤية الجسيمات؛ لأن قوة تكبيرها غير كافية.
- يستخدم العلماء المجاهر الإلكترونية لرؤية الجسيمات المنفردة مثل خلية الدم الواحدة.

How can we show that the particles exist?

Although air is invisible, we can observe a balloon expands when we blow it up.

What happens when you blow up a balloon?

- 1 The particles of air move very quickly inside the balloon and bounce off it from inside.



- 2 Air particles exert a force that inflates the balloon and gives it its round shape.



- 1 تتحرّك جسيمات الهواء بسرعة كبيرة وترتد عند اصطدامها بالبالون من الداخل.
- 2 تبذل الجسيمات قوة؛ مما يؤدي لانتفاخ البالون وتكوّن شكله الدائري.

What happens when you squeeze a balloon filled with air?

When you squeeze the balloon,

the particles become closer together so the balloon becomes smaller.

إذا ضغطت على البالون، ستقترب الجسيمات من بعضها البعض؛ وبالتالي سيقول حجم البالون.

When you squeeze the balloon too hard,

the balloon pops and the air particles escape out into the air.

إذا ضغطت على البالون بشدة، سينفجر البالون وستتسرب جسيمات الهواء للخارج.

Check your understanding?

Put (✓) or (x)

- 1 We use a normal microscope to see the particles of matter. ()
- 2 The movement of particles inside the balloon makes it inflate. ()

Lesson Three

Answered

1 Choose the correct answer:

1. When water is heated, its particles
 (a) move slower (b) move faster
 (c) move with the same speed (d) don't move
[Damietta 2023]
2.  Which of the following substances can be poured?
 (a) Salt (b) Water vapor (c) Milk (d) Air
3. All the following are from the properties of solid particles, except they
 (a) are closely packed together
 (b) vibrate around their places
 (c) move freely from one place to another
 (d) can't slide over each other.
4. Particles of vibrate around their place.
 (a) iron (b) air (c) oxygen (d) water
[Alex. 2023]
5. The state of matter changes by changing its
 (a) size (b) mass (c) temperature (d) color
[Menofya 2024]
6. The particles are held together more loosely in the case of the state.
 (a) solid (b) liquid (c) gas (d) air
[Alex. 2023]
7. When you heat a liquid matter,
 (a) it changes into a solid matter (b) its particles speed decreases
 (c) its particles stop moving (d) it changes into a gas matter
8. The particles of move faster than the particles of water.
 (a) ice (b) water vapor (c) wood (d) glass
9. The particles of spread out very quickly and fill up their container.
 (a) air (b) wood (c) milk (d) glass
10. To examine the structure of tiny particles of a matter, we can use the
 (a) thermometer (b) balance (c) ruler (d) microscope
[Cairo 2023]
11. To see the components of one blood cell, we need a/an
 (a) electron microscope (b) scale
 (c) measuring tape (d) balance
[Giza - Alex. 2023]

12.  A matter has a fixed volume and a variable shape.
 (a) solid (b) liquid (c) frozen (d) gaseous
13.  The distances between the particles of a gaseous matter are
 the distances between the particles of a liquid matter.
 (a) less than (b) greater than (c) equal to (d) smaller than
14. When you squeeze a balloon filled with air,
 (a) the air particles spread out (b) the balloon size increases
 (c) the air particles become closer (d) the balloon becomes bigger

2 Put (✓) or (X):

1. We can't see the particles of matter with a normal microscope. ()
2.  Milk has a fixed shape whatever the shape of the container is. ()
3. Particles of gold are different from particles of iron. ()
4.  The particles of a solid matter spread very quickly. ()
5. Liquid particles are held together more loosely than solid particles. ()
6. Liquid particles move more freely than solid particles. (Giza 2023) ()
7.  When we press on a balloon, its volume increases. ()
8. Particles of water vapor are not held together. ()
9. Water evaporates when it is exposed to a low temperature. ()

3 Write the scientific term:

1. The building units of matter. (.....)
2. A state of matter that completely fills a closed container. (.....)
3. A device used to see the components of one blood cell. (.....)
4. A state of matter whose particles are not held together. (.....)
5. A state of matter whose particles can slide over each other so they take the shape of their container. (.....)

4 Complete the following sentences:

1. An is a device used to see one tiny particle such as a blood cell. (Qalyubia 2024)
2. When you blow a balloon, gas particles exert a inside it, so the balloon's volume
3. Particles of the matter slide over each other, so they take the of their container. (Luxor 2023)
4. On squeezing a balloon filled with air, its volume
5. Particles of liquids move faster than particles of and slower than the particles of

5 Look at the following figures, then put (✓) or (x):

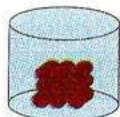


Figure (1)



Figure (2)

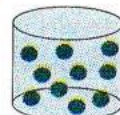


Figure (3)

1. The particles in figure (1) are not held together. ()
2. The matter in figure (2) take the volume of the container. ()
3. The particles in figure (2) are held together more loosely than the particles in figure (1). ()
4. The particles in figure (3) move very quickly and fill up a closed container. ()

6 Give a reason for:

1. Scientists can't use normal microscopes to see particles of matter.
.....
2. A piece of iron keeps its shape when putting it into any container.
.....
3. Liquids take the shape of their containers. (Qalyubia 2023)
.....
4. Gas particles move faster than liquid particles.
.....

12 What happens if:

1. The size of the balloon when you blow up it?

(Cairo 2024)

2. The speed of liquid particles when it changes into a gas?

(Alex. 2023)

3. The volume of a balloon filled with air when you squeeze it?

4. The shape of a liquid when pouring it into a container?

5. The state of ice cubes when you expose them to high temperature?

Lesson

4

Activity 8 Models

» Put (✓) or (X):

- 1 It is difficult to see a real heart in your science laboratory. ()
- 2 The model of the heart is similar to the real heart. ()



Real heart

Model of Heart

Model

It is a copy that is similar to a real thing.

النموذج: هو نسخة مشابهة تمامًا للشيء الحقيقي الذي يمثله.



- Models look, move, or work like the real thing.

• تشبه النماذج الجسم الحقيقي وتتحرك مثله وتعمل مثله.

Importance of Models:

1

Models are a great way to see many things at the **right size** (not the real size).

تساعدنا النماذج على رؤية الأجسام بالحجم المناسب لنا (ليس الحجم الحقيقي).

2

Models help us understand **how things work**.

تساعدنا النماذج على فهم كيفية عمل الأشياء.

1 Models help us look at big things.

» Models represent very big things in smaller sizes.

• تساعدنا النماذج على رؤية الأجسام الكبيرة بأحجام أصغر.

A Globe

Globe is a model of the whole Earth in the shape of large ball.



We can't see all of the Earth while we are standing on it because it is too big,



we can use a globe to study the Earth planet.



The Globe shows us

1 The shape of the Earth.

شكل كوكب الأرض

2 How much Earth is covered with oceans.

كيف أن الأرض مغطاة بالمحيطات

3 Where different countries are located.

مواقع الدول المختلفة

B Solar System Model

Solar system is a very big place that consists of sun and eight planets.

Importance of solar system model:

1 It shows us all the planets at once.

2 It helps us compare between planets according to:

a The size: Which planet is the biggest?

b The location: Which one is the closest to the Earth?



1 نموذج المجموعة الشمسية يظهر لنا جميع الكواكب معًا.

b الموقع: أي كوكب أقرب إلى الأرض؟

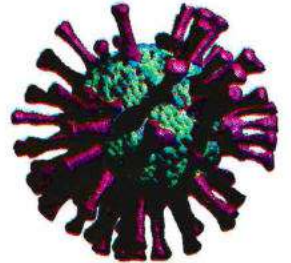
2 يساعدنا في المقارنة بينها وفقًا لما يلي: a الحجم: أي كوكب أكبر؟

2 Models help us look at small things.

» Models represent very tiny things in a larger size.

A germ model helps us to see:

- 1 The shape of germs without a microscope.
- 2 The different parts of germs that help them spread from one person to another.



- 1 نموذج الجراثيم: يمكن أن يعرض لك شكل الجراثيم حتى بدون استخدام المجهر.
- 2 يمكنك رؤية الأجزاء المختلفة التي تساعد الجراثيم على الانتقال من شخص إلى آخر.

3 Models help us understand how things work.

» Models help us see and understand how things work, such as:

A model of a volcano



shows the volcano shape and how ooze liquid comes out during a real eruption.

نموذج البركان: يوضح كيف يفرز البركان سائلًا ما أثناء ثوران بركان حقيقي.

A model of an airplane



shows how an airplane flies up in the air.

نموذج الطائرة: يوضح كيف تطير الطائرة في الهواء.

Check your understanding?

» Put (✓) or (x)

- 1 A model is a great way to see big things in their real size. ()
- 2 Germs are spread around us, which makes us sick. ()

Activity 9 Modeling States of Matter

» In this activity, you will create three models to represent the arrangement of particles inside the different states of matter.

Tools:



Three index cards



Small buttons



Glue



Marker

Steps:

- 1 Label the three index cards with a solid, liquid, or gas using a marker.
- 2 Create a model for solid, liquid, and gas using glue and small buttons.

Observations:

Model of a Solid



Particles of a solid are **organized**.
(regular pattern)

Model of a Liquid



Particles of a liquid are **not well organized**.
(random arrangement)

Model of a Gas



Particles of a gas are **not organized at all**.
(random arrangement)

Conclusion:

» The arrangement of particles describes the state of matter.

Check your understanding?

» Put (✓) or (x)

- 1 The particles of gas matter are very close to each other. ()
- 2 The particles of solids are arranged in a regular pattern. ()

Lesson Four

Answered

1 Choose the correct answer:

- The is a model of the Earth that is round like a ball.
 (a) map (b) globe (c) volcano (d) chart
- Models can represent tiny things in a bigger size, such as the model of
 (a) the globe (b) a volcano (c) an airplane (d) a germ
- come out of a volcano have a/an shape.
 (a) Solids – indefinite (b) Liquids – definite
 (c) Liquids – indefinite (d) Gases – definite
- The particles of have a random arrangement.
 (a) gases only (b) liquids only
 (c) solids only (d) liquids and gases
- Particles of are so far from each other.
 (a) glass (b) air (c) water (d) sand
- Particles that make up a cube of sugar
 (a) don't have a definite shape or volume.
 (b) are organized in a random pattern.
 (c) are organized in a regular pattern.
 (d) are not held together.

2 Put (✓) or (x):

- A model of an airplane shows us how it flies up into the air. (Giza 2023) ()
- The globe is a model that represents all the planets in the solar system. ()
- Solar system consists of sun and eight planets. ()
- A model is a great way to study big or small objects in the real size. ()
- Germs can be seen with the naked eye. ()
- Particles of a liquid have a random arrangement. (Gharbia 2024) ()
- Wood particles are organized in a regular pattern. ()
- Models help us understand how things work. ()

3 Write the scientific term:

1. A copy that is similar to a real thing that we can't see with our eyes.

(Fayoum 2023) (.....)

2. A model of the Earth that shows us the location of different countries.

(.....)

3. A model that shows us all planets and sun at once.

(.....)

4 Complete the following sentences:

1. is a copy that is similar to a real thing that shows what it looks like or work like.

(Gharbiya 2023, Alex. 2024)

2. A model of a germ helps us see its shape without using a that is used to magnify tiny objects.

(Suez 2023)

3. The model of shows us how much the Earth is covered with water, while the model of makes us compare the size of the Earth and other planets.

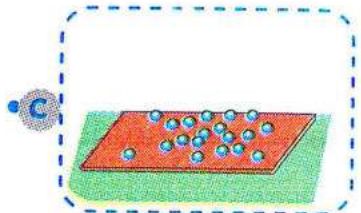
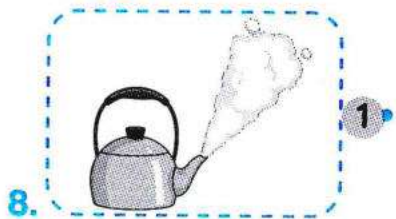
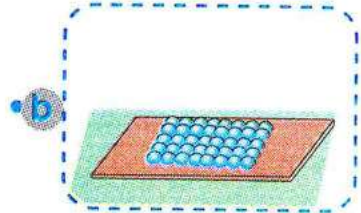
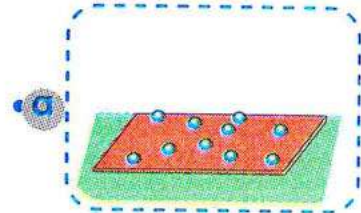
4. spread out in the air and make us get infected by diseases.

5. Some liquids come out of a during its eruption.

6. The particles of the matter have an organized arrangement.

7. can be poured, as they don't have a definite

5 Look at the following figures, then match each one with their particles arrangement:



6 Give a reason for:

1. The arrangement of particles in a solid state is different than in a liquid state.

.....

2. Science teachers always use models in laboratory.

.....

3. The globe is a useful tool for students.

.....

7 What happens to:

• The arrangement of water particles after freezing?

(Aswan 2023)

.....

.....

Lesson

5

Matter in the World Around Us

Activity 10 Record Evidence Like a Scientist

Concept 1



Question:

» What are the different forms of matter that can be found in the world around us?



My Claim:



Evidence:



Scientific Explanation with Reasoning:

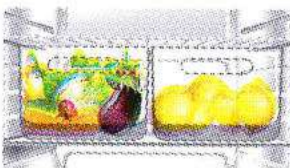
Activity 11 Careers and States of Matter

Unit 2

- » Chefs use science to prepare delicious dishes.
- » Chefs use three states of matter, such as:

Solid matter	Liquid matter	Gas matter
• Vegetables • Rice • Pasta	• Water • Juice • Oil	• Steam of boiling water • Aroma (odor of food) • Natural gas used in the gas oven.

- » Chefs can change the state of ingredients during preparing food, such as:

Freezing vegetables	Boiling water
To keep them fresh and ready to be used for a long period of time. 	To cook rice or pasta. 

What happens if:

- ① You add a cup of water into the freezer for a period of time?
 - The water freezes and changes from water to ice.
- ② You add boiled vegetables to a bowl of cold, iced water?
 - The temperature of the vegetables decreases, while the temperature of water increases.

Check your understanding?

» Put (✓) or (x)

- ① Aroma helps us know the kind of food. ()
- ② When you boil some water, water changes into ice. ()

Lesson Five

Answered

1 Choose the correct answer:

- has neither a definite shape nor a definite volume.
 (a) Oil (b) Rice (c) Sugar (d) Natural gas
- When water boils, it changes from state to state.
 (a) solid – gas (b) gas – liquid (c) liquid – gas (d) liquid – solid
- In a solid state, the particles
 (a) are not held together (b) take the shape of their container
 (c) vibrate in their places (d) move very quickly
- Which of the following is an example of a solid matter?
 (a) Vinegar (b) Frozen milk (c) Water (d) Oil

2 Put (✓) or (X):

- The smell of food coming from the kitchen is a gas matter. ()
- Heating vegetables keeps them fresh for a long period of time. ()
- When we put a cup of juice in the freezer, it changes from a liquid state into a solid state. ()
- Milk and salt are solid matter. ()

3 Complete the following sentences using the words below:

(a solid – vinegar – boil – liquids)

- such as take the shape of the container.
- When you leave a cup of water in the freezer, it changes into state.
 [Giza 2023]
- Steam is released when water in a pot starts to

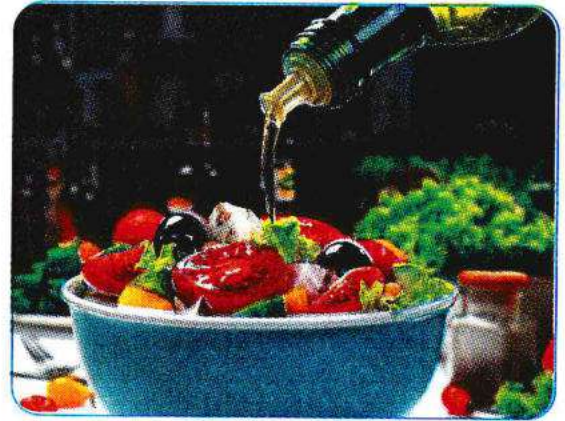
4 Look at the following figure, then choose the correct answer:

1. Oil can be poured because,

- (a) it has a definite shape
- (b) its particles are held tightly together
- (c) it is a liquid matter

2. The components of the vegetable salad are solids that have a

- (a) definite shape
- (b) indefinite shape
- (c) indefinite volume



5 Give a reason for:

1. Chef keeps vegetables in the freezer.

.....

.....

2. When water boils, its state changes.

.....

.....

6 What happens if:

- We put a cup of water in the freezer?

(Alex. 2023)

.....

.....

Concept

2.2

Describing and Measuring Matter



Concept 2

Describing and Measuring Matter

Lesson 1

- Activity 1** Can You Explain?
- Activity 2** A Roof for Every Type of Climate
- Activity 3** What Do You Already Know About Describing and Measuring Matter?

Lesson 2

- Activity 4** The Case of the Kitchen Mystery

Lesson 3

- Activity 5** Properties of Matter
- Activity 6** Measuring Properties
- Activity 7** Measuring Matter

Lesson 4

- Activity 8** Useful Properties of Matter
- Activity 9** Uses of Matter
- Activity 10** Record Evidence Like a Scientist

Glossary

Lesson (1)

Activity (1)			
Describe	يصف	Properties	خواص
Activity (2)			
Roof	سقف	Stones	أحجار
Dust	تراب	Wood	خشب
Wind	رياح	Protect	يحمي
Flat	مسطو	Dirt	غبار
		Climate	مناخ
		Slanted (inclined)	مائل
		Metals	معادن
		Ceramic tiles	بلاط سيراميك
		Tropical rainforest	غابة استوائية مطيرة
		Accumulate	يتراكم

Activity (3)			
Describing	وصف	Measuring	قياس
		Measuring cup	وعاء القياس
		Suitable use	استخدام مناسب

Lesson (2)

Activity (4)			
Salt	ملح	Odor	رائحة
Sugar	سكر	Smooth	ناعم
		Pepper	فلفل
		Flour	دقيق
		Hand lens	عدسة اليد المكبرة
		Crystals	حبيبات

Lesson (3)

Activity (5)			
Observe	يلاحظ	Arrangement	ترتيب
Vinegar	خل	Perfume	برفان (عطر)
Physical properties		Chemical properties	
		Ability	القدرة
		Ash	رماد
		Interact	يتفاعل
		Rust	صدأ
			خواص كيميائية

Activities (6 & 7)			
Wooden cube	مكعب خشبي	Cork	فلين
Stone	حجر	Iron nail	مسمار حديد
Magnet	مغناطيس	Basin	وعاء
		Float	يطفو
		Attract	يجذب
		Sink	يغوص
		Density	كثافة

Lesson (4)

Activity (8)			
Helium	غاز الهيليوم	Light	خفيف
Poisonous	سام	Flammable	قابل للاشتعال
Balloons	بالونات	Blimps	مناطيد
Safe	أمن	Copper	نحاس
		Conductor	مُوصِل
		Flexible	مرن
		Heat	حرارة
		Conduction	توصيل
		Stretch	يشكل
		Electricity	الكهرباء

Activities (9 & 10)			
Steel	فولاذ	Screwdriver	مفك الكهرباء
Glass	زجاج	Light bulb	مصباح كهربائي
Rubber	مطاط	Tires	إطارات السيارات
		Hard (strong)	قوي
		Transparent	شفاف
		Waterproof	مقاوم للماء
		Hammer	مطرقة
		Gloves	قفاز
		Athletic shoes	أحذية رياضية

Lesson

1

Activity 1 Can You Explain?

Observe the following figure, then complete:

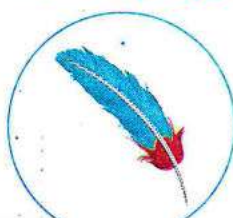


You have learned that:

- » Matter is everything around us that has **mass** and takes up **space**.
- » Matter can be **described** by **different properties**, such as:



Shape: round

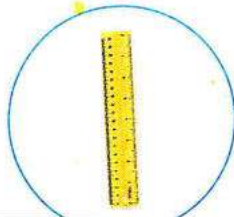


Texture: smooth

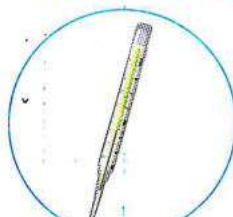


Color: white

- » Matter can be **measured** using **specific tools**, such as:



Ruler



Thermometer



Balance

Activity 2 A Roof for Every Type of Climate

Each building must have a roof that protects it from dust, dirt, wind, rain, snow, or animals.

• لا بُدُّ أن يكون لكل مبنى سقف؛ لحمايته من التراب أو الغبار أو الرياح أو الأمطار أو الجليد أو الحيوانات.

1 Roof Shapes

- Roof shapes are different according to their purpose.
- **The roof shape could be:**
 - 1 Flat
 - 2 Slanted (inclined)

2 Roof Materials

- Roof materials depend on the climate where the home is located.
- **The roof material could be:**
 - 1 Stones
 - 2 Metals
 - 3 Wood
 - 4 Leaves and sticks
 - 5 Ceramic tiles

1 شكل السقف:

- تختلف أشكال الأسقف حسب الغرض المطلوب منها.
- قد يكون شكل السقف: 1 مسطح. 2 مائل.

2 مادة السقف:

- تعتمد مادة بناء السقف على المناخ الذي يوجد به المنزل.
- قد تكون مادة بناء السقف: 1 أحجار. 2 معادن. 3 خشب. 4 أوراق وسيقان الأشجار. 5 بلاط السيراميك.

What happens if:

- 1 **Snow falls on a slanted (inclined) roof?**
 - Snow slides down over it.
- 2 **Snow falls on a flat roof?**
 - Snow accumulates (collects) on the roof.



Cold Weather Home

Let's study the properties of some roofs in different climates:

	Desert Home	Cold Weather Home	Tropical Rainforest Home
Figure			
Roof Material	Strong stones	Ceramic tiles (Bricks)	Leaves and sticks
Roof Shape	Flat	Inclined (Slanted)	Inclined (Slanted)
Reason	– To protect the home from dust and dirt. – To reflect the heat coming from the sun.	– To allow snow or rains to slide over it.	– To prevent animals from getting inside the home.



Check your understanding?

» Put (✓) or (x):

- The roof material depends on the climate where the home is built. ()
- The roof of a desert home is similar to the roof of a tropical rainforest home. ()

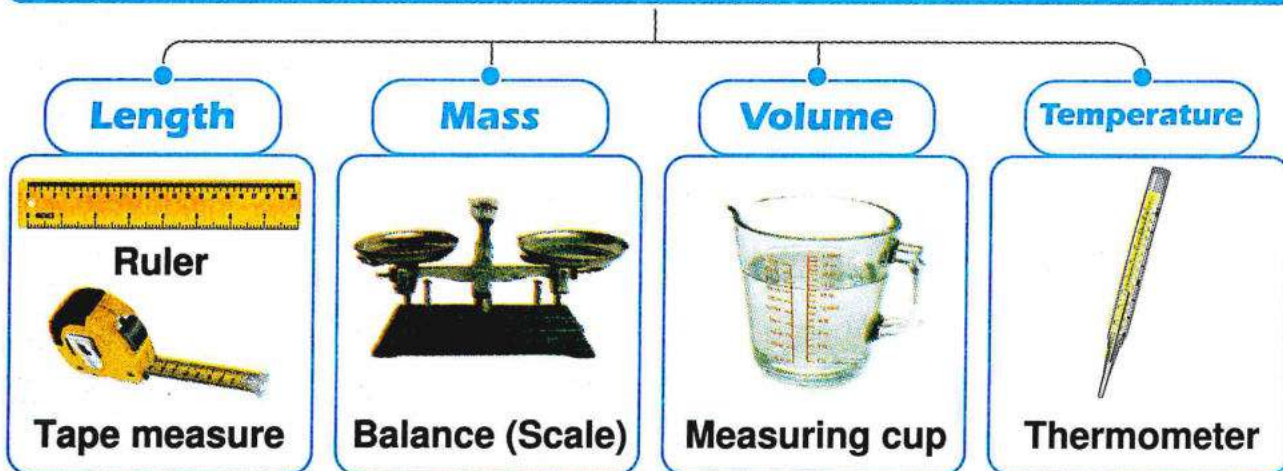
Activity 3 What Do You Already Know About Describing and Measuring Matter?

» Let's learn about how to describe and measure matter.

Some properties are **described** by using **senses** such as:



Some properties are **measured** by using **specific tools** such as:



- Each matter has its own properties.
- **Measuring** the properties of matter helps us know its **suitable usage**.

• لكل مادة خصائص محددة. • يساعدنا قياس خصائص المادة في تحديد الاستخدام الأمثل لها.

Check your understanding?

» Complete the following sentences:

- 1 A is used to measure the mass of a plastic cube.
- 2 A measuring cup is used to measure the of water.

Lesson One

Answered

1 Choose the correct answer:

1.  Which of the following properties of matter cannot be measured?
 (a) Length. (b) Mass. (c) Taste. (d) Volume.
2. A cold weather home is made of
 (a) leaves (b) sticks
 (c) ceramic bricks (d) snow
3. A desert home is made of stones to protect it from
 (a) dirt and snow (b) dust and dirt
 (c) rain and dust (d) rain and animals
4. are suitable materials to build a home in a tropical rainforest area.
 (a) Leaves and stones (b) Snow and stones
 (c) Sticks and ceramic tiles (d) Sticks and leaves
5. Which of the following homes have an inclined roof?
 (a) Desert home only.
 (b) Tropical rainforest home only.
 (c) Desert homes and cold desert homes.
 (d) Tropical rainforest home and cold weather home. [Gharbia 2023]
6. We can determine the of matter without using any measuring tool.
 (a) volume (b) length (c) taste (d) temperature
7. We can measure the mass of an apple by using a
 (a) thermometer (b) ruler
 (c) measuring cup (d) balance
8. We can use a measuring cup to measure the of a liquid. [Cairo 2023]
 (a) mass (b) length (c) temperature (d) volume
9.  You can measure the length of your classroom using a
 (a) balance (b) tape measure
 (c) measuring cup (d) thermometer

2 Put (✓) or (X):

1. We can describe a solid matter by its texture and shape. (Giza 023) ()
2. A thermometer is used to measure the temperature of a hot cup of tea. (Cairo 2023) ()
3.  The roof of a desert home is similar to that of a rainforest home. (Alex. 2024) ()
4.  The shapes of houses vary from one environment to another. ()
5. The roof of a desert home is made up of strong stones to protect it from snow. (Sohag 2024) ()
6. The roof of a desert home is slanted. ()
7. The mass of matter is measured by a thermometer. (Helwan 2024) ()
8. A measuring cup is used to measure the mass of a liquid. ()

3 Write the scientific term:

1. A material that is used to build the roof of desert homes. (.....)
2. A material that is used to build the roof of cold weather homes. (Beheira 2024) (.....)
3. A tool that is used to measure the temperature of milk. (.....)
4. A tool that is used to measure the length of book. (.....)
5. A tool that is used to measure the volume of a liquid. (.....)
6. A property of matter that can be measured by a tape measure. (Damietta 2023) (.....)

4 Complete the following sentences:

1. is used to determine the volume of an amount of water. (Cairo 2023)
2. A tropical rainforest home's roof prevents from getting inside.
3. A is used to measure the mass of your bag.

4. The roof of a desert home is and is made of strong
5.  The roof of the house is sloping in places with weather.

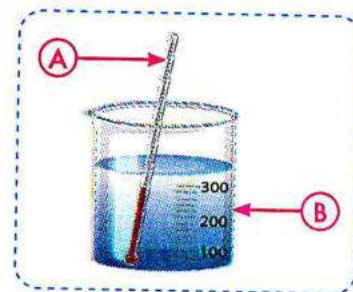
5 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. Ceramic tiles	Ⓐ is used to measure the length of a book.
2. Taste sense	Ⓑ are used to build roofs of cold weather homes. [Giza 2023]
3. Measuring cup	Ⓒ is used to differentiate between sugar and salt.
4. Ruler	Ⓓ is used to measure a certain volume of food oil. [Banha 2023]

1. 2. 3. 4.

6 Study the opposite figure, then complete the sentences below:

1. Device (A) is used to measure the of water.
2. Device (B) is used to measure the of water.



7 Give a reason for:

1. The roof of a tropical rainforest home is made of leaves and sticks. [Alex. 2023]
2. The roof of a desert home is made of strong stones. [Giza 2024]

8 What happens if:

1. The roof of a desert home is made of sticks and leaves?
2. The roof of a cold climate home is flat?

9  Mention the importance of the following tools:

(a) Measuring cup.

(b) Tape measure.

(c) Balance.

(d) Thermometer.

Lesson 2

Activity 4 The Case of the Kitchen Mystery

» Tick (✓) the correct answer:

- 1 We can differentiate between salt and pepper using our
☐ sight sense ☐ hearing sense
- 2 We can differentiate between salt and sugar using our
☐ sight sense ☐ taste sense

» In this experiment, you will examine different substances that look alike.
Most of the substances are labeled, but one is a mystery.

Tools:



The unknown mixture consists of two substances from (sugar – salt – flour).

To identify the unknown mixture, observe the properties of each substance.

Steps:

- ① Check the **color** of all the substances with your eyes.
- ② Touch all the substances with your hand to feel their **texture**.
- ③ Smell all the substances to know their **odor**.
- ④ Use the lens to examine the **size** of the crystals of each substance.

Results:

Substance	Color	Size of Crystals
Sugar	White	Large crystals
Salt	White	Small crystals
Flour	White	Fine particles
Unknown mixture	White	Large crystals and fine particles

Observations:

- » All substances have the **same color**.
- » They have **different odor** and **different texture**.
- » The unknown mixture is a mixture of sugar and flour.

Conclusion:

- » Color, shape, odor, and texture are physical properties of matter that help us describe or identify it.

• اللون والشكل والرائحة والملمس من الخواص الفيزيائية التي تساعدنا على وصف المادة.

NOTES:

- Some physical properties, such as shape, color, odor, and texture can be **observed by our five senses**.
- Some physical properties, such as temperature and mass, can be **measured with special tools**.

Check your understanding?

» Put (✓) or (X):

- 1 A hand lens is used to identify the odor of salt. ()
- 2 Sugar and salt differ in their taste, odor, and color. ()

Pony Exercises on

Lesson Two

Answered

1 Choose the correct answer:

1. Salt and sugar have the same
☐ (a) texture ☐ (b) taste ☐ (c) odor ☐ (d) color
2. We determine the texture of sugar by the sense of
☐ (a) smell ☐ (b) taste ☐ (c) touch ☐ (d) hearing
3. We use the to see the small crystals of sugar.
☐ (a) ruler ☐ (b) hand lens ☐ (c) scale ☐ (d) measuring cup
4. Which sense do you use to identify the odor of a substance?
☐ (a) Sight. ☐ (b) Touch.
☐ (c) Smell. ☐ (d) Taste.
5. You use your sense of sight to differentiate between
☐ (a) vinegar and water ☐ (b) salt and sugar
☐ (c) oil and milk ☐ (d) oxygen and nitrogen

2 Put (✓) or (X):

1. You can differentiate between water and milk by their color and taste. ()
2. Salt and sugar are similar in their color and texture. ()
3. Texture and shape are among the physical properties of matter. ()
(Beni Suef 2023)
4. The crystals of salt have a larger size than those of sugar. ()
5. The sour taste of a lemon is one of its physical properties. ()
6. You can differentiate between pepper and salt by the sense of sight. ()

3 Complete the following sentences using the words below:**(sugar – physical – sight – touch – flour – smell)**

1. Odor and texture are from the properties of matter. (Giza 2023)
2. has very fine particles, while has large-sized crystals.
3. The color of matter is identified by the sense of, while its texture is identified by the sense of
4. You can differentiate between vinegar and perfume by your sense of

4 Look at the following figures, then choose the correct answer:**Salt****Sugar****Cocoa powder**

1. You can differentiate between cocoa powder and salt by your sense(s) of
 (a) sight only (b) taste only (c) sight and taste
2. You can differentiate between salt and sugar by all the following properties, except the property.
 (a) taste (b) color (c) odor
3. Which of the following statements is correct?
 (a) The size of sugar crystals is larger than that of salt crystals.
 (b) The size of sugar crystals is smaller than that of salt crystals.
 (c) Crystals of both sugar and salt have the same size.

5 Give a reason for:

- You can't differentiate between sugar and salt by your sense of sight.

Lesson

3

Activity 5 Properties of Matter

» Put (✓) or (X):

1. When water is heated, it turns into new matter. ()
2. When wood is burned, it forms new matter. ()



Properties of Matter are classified into:

1 Physical properties

2 Chemical properties

1 Physical properties

They are properties of matter that is observed by our five senses or measured using a specific tool without changing the structure of matter.

» You can **observe** some physical properties using your five senses, such as:

Color

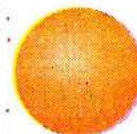
Gold ring



Silver ring

Shape

Cube



Round

Odor

Vinegar



Perfume

Texture

Smooth



Rough

» You **measure** some physical properties such as volume, mass and temperature using specific tools.

Volume	Mass
- It is the amount of space that matter takes up. - مقدار الحيز الذي يشغله الجسم من الفراغ.	- It is a measurement of the amount of matter. - مقدار ما يحتويه الجسم من مادة.
Measuring Units	Measuring Units
- Liters (L) - Milliliters (mL) - Cubic centimeters (cm³) (1 L = 1,000 mL = 1,000 cm³)	- Kilograms (kg) - Grams (g) (1 kg = 1,000 g)
Measuring Tools	Measuring Tools
Measuring cup 	Balance (scale) 

NOTE:

- A big bottle of water contains **1 liter** or more.
- A paperclip has a mass of about **1 gram**.
- One liter of water = One kilogram of water.

**Temperature**

It is a physical property that measures how quickly the particles in a substance are moving.

» Temperature can be measured using a **thermometer**.

» Quickly-moving particles produce more thermal energy than slow-moving particles.

2 Chemical properties

They are properties that describe matter according to its ability to change into new matter that has different properties.

» They are observed only by **changing the substance** into a new one.

Examples:

1 The ability to burn:

When paper is burned, it interacts with fire, so it becomes ash.



Burning



2 The ability to rust:

When iron nails interact with water and air, they rust.



Rusting



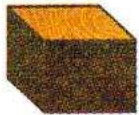
Check your understanding?

» Put (✓) or (x):

- 1 Mass is measured in a unit called a kilogram. ()
- 2 Forming ash is considered a physical property of paper. ()
- 3 Centimeter is the measuring unit of volume. ()
- 4 When particles move faster, they produce more thermal energy. ()

Activity 6 Measuring Properties

» In this experiment, you will identify some physical properties of matter.

Tools:

Wooden cube



Stone



Iron nail



Cork



Magnet



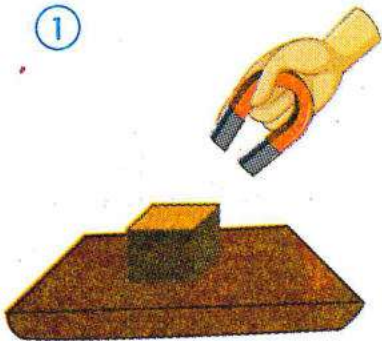
Balance



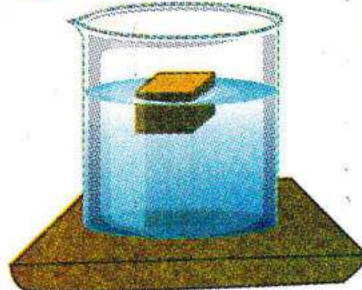
Basin containing water

Steps:

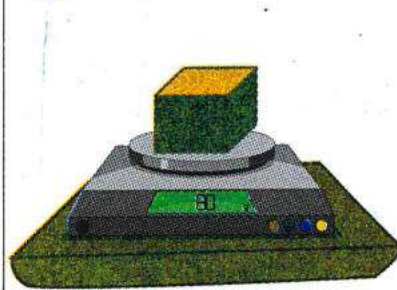
①



②



③



- ① Approach the magnet to the wooden cube.
- ② Put the wooden cube in the water basin and observe what will happen?
- ③ Use the balance to measure the mass of the wooden cube.
- ④ Repeat the previous steps using a cork, an iron nail, and a stone.

Observations:

Property	Wooden Cube	Iron Nail	Cork	Stone
1 Attracted to the Magnet or Not	Not attracted	Attracted	Not attracted	Not attracted
2 Sink or Float	Floats	Sinks	Floats	Sinks
3 Mass	80 g	20 g	40 g	70 g

Conclusions:

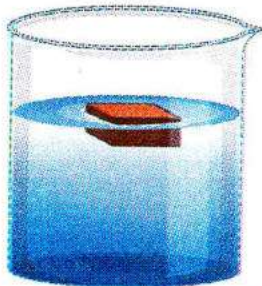
- » Some materials are attracted to the magnet, and other materials aren't attracted to the magnet.
- » The **floating** or **sinking** of objects doesn't depend on their masses, but it depends on their density.

• بعض المواد تنجذب للمغناطيس، والبعض الآخر لا يجذب للمغناطيس.
• قدرة الأجسام على الطفو أو الغوص لا يعتمد على كتلتها، ولكن يعتمد على كثافتها.

Give a reason for:

① **A wooden cube floats on the water surface.**

- Because the density of wood is less than the density of water.



② **An iron cube sinks in water.**

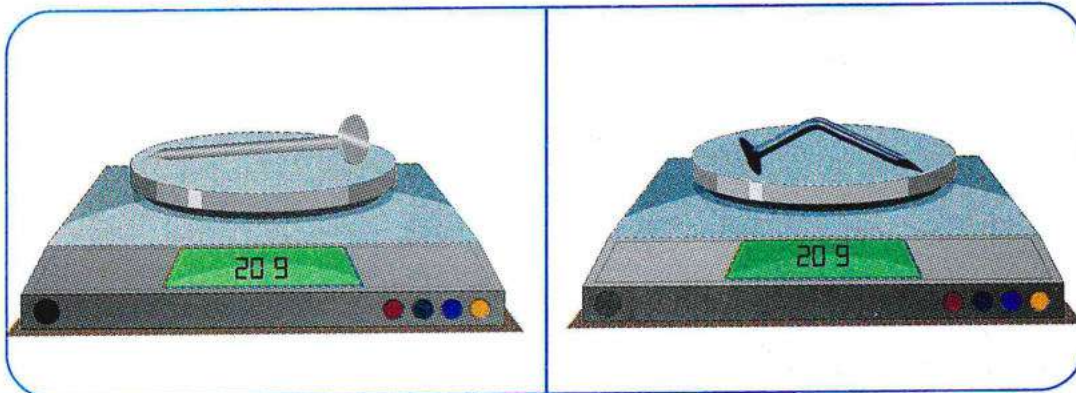
- Because the density of iron is more than the density of water.



Does the change in shape and size affect the object's mass?

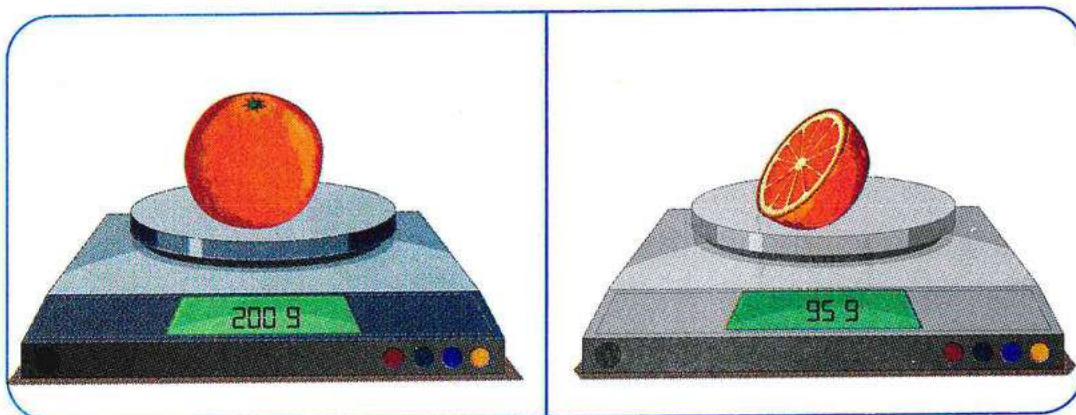
- 1 The change in the shape of matter doesn't affect its mass, for example:

On changing the shape of the nail, its mass doesn't change.



- 2 The change in the size of a matter affects its mass, for example:

If you cut an orange into two halves, the mass of each half is less than the mass of the original one.



Check your understanding?

» Put (✓) or (X):

- 1 Changing the size of matter doesn't affect its mass. ()
- 2 A magnet attracts a piece of cork. ()
- 3 Iron nail sinks in water and is not attracted to the magnet. ()
- 4 Floating or sinking of any object in water depends on its mass. ()

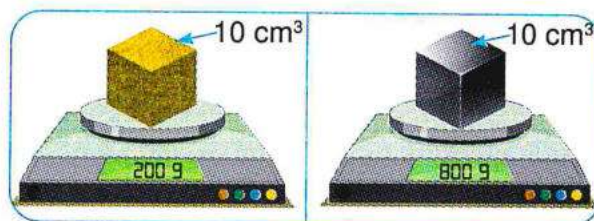
Activity 7 Measuring Matter

» In this table, there are three different materials observe the data of each one, then choose the correct answer:

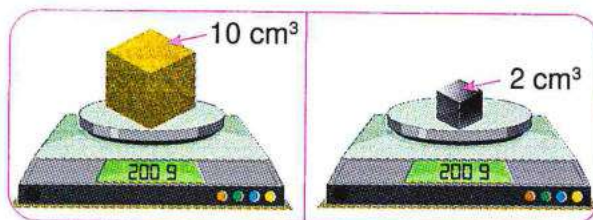
	Mass (g)	Length (cm)	Volume (mL)
Material (1)	189	37	100
Material (2)	150	55	115
Material (3)	99	23	5

- contains more matter than material (2). [Material (1) – Material (3)]
- is taller than material (1). [Material (3) – Material (2)]
- takes up more space than material (1). [Material (2) – Material (3)]

» Equal volumes of different substances have different masses.



» Equal masses of different substances have different volumes.

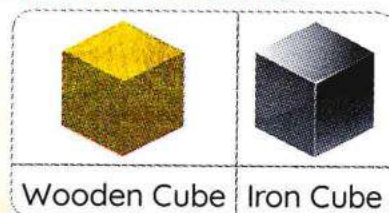


Check your understanding?

» Study the following figures, then choose the correct answer:

(iron – wooden – volume – masses – sinks in – floats on)

- The two cubes have the same
- The two cubes have different
- The wooden cube the water surface.
- A magnet can attract the cube.



Lesson Three

Answered

1 Choose the correct answer:

- When you burn a piece of paper,
 (a) its color becomes white (b) it rusts
 (c) it forms ash (d) it is a physical property of paper
- rusts when it reacts with water and air.
 (a) Iron (b) Wood (c) Paper (d) Ash
- The physical property of milk that you see is its (Gharbiya 2023)
 (a) odor (b) texture (c) color (d) taste
- All the following are physical properties of matter, except
 (a) texture (b) color (c) shape (d) rusting (Ismailia 2023)
- Volume is the that is occupied by an object. (Banha 2023)
 (a) space (b) time (c) temperature (d) water
- The measuring unit of mass is the (Alex. 2024)
 (a) liter (b) gram (c) cm (d) mL
- The measuring unit of volume is the (Cairo 2023)
 (a) cm (b) kg (c) cm^3 (d) gram
- The volume of one liter of water has the mass of (Alex. 2023)
 (a) one gram (b) one kilogram (c) one millimeter (d) one cm^2
- A half-liter of water may equal a mass of
 (a) 1,000 g (b) 1 kg (c) 500 kg (d) 500 g
- 1 kg of a substance has a greater number of particles than of the same substance.
 (a) 2 kg (b) 3 kg (c) 500 g (d) 1.5 kg
-  All the following are chemical properties of matter, except
 (a) burning (b) combustion (c) color (d) rust

12. If you put in water, it floats on its surface.
 - (a) a coin
 - (b) a rock
 - (c) a piece of cork
 - (d) a metallic spoon
13. All the following materials are not attracted to the magnet, except
 - (a) a stone
 - (b) a plastic toy
 - (c) a wooden fork
 - (d) an iron nail
14. A piece of sinks in water and is also attracted to magnets.
 - (a) rock
 - (b) wood
 - (c) cork
 - (d) iron
15.  The amount of matter that the body contains is known as
 - (a) volume
 - (b) temperature
 - (c) mass
 - (d) length
16.  The is known as the space occupied by a body.
 - (a) mass
 - (b) volume
 - (c) length
 - (d) temperature
17.  The is considered one of the chemical properties of matter.
 - (a) color of apples
 - (b) smell of vinegar
 - (c) burning of a piece of paper
 - (d) color of gold
18.  All the following describe the physical properties of matter, except
 - (a) salt texture
 - (b) sugar taste
 - (c) iron rust
 - (d) milk color

2 Put (✓) or (X):

1. The ability of matter to burn and rust is considered from chemical properties of matter. (Giza 2023) ()
2. One kilogram = 100 grams. (Alex. 2024) ()
3. One liter of water has a mass of one kilogram. (Qalyubia 2024) ()
4. Gram is the measuring unit of mass. (Beni Suef 2023) ()
5. Volume is the space that is taken by matter. (Cairo 2023) ()
6. The mass of an iron bar, whose volume is 100 cm^3 , equals the mass of a wooden bar, which has the same volume. (Cairo 2023) ()
7. If the masses of two different materials are equal, their volumes must be equal. (Dakahlia 2023) ()
8. An iron spoon is attracted to the magnet. (Damietta 2023) ()
9.  The texture of the fabric is one of the chemical properties of fabric. ()
10.  We can distinguish between iron and gold using the sense of smell. ()
11.  Temperature expresses the speed of particles movement in the matter. ()

3 Write the scientific term:

1. They are the properties of matter that can be measured or observed by our five senses. (.....)
2. They are the properties of matter that describe how matter interacts with another matter. (.....)
3. It is the amount of space that matter takes up.
(Ismailia 2023 & Cairo 2023) (.....)
4. It is a measure of the amount of matter. (.....)
5. It is a measurement of how quickly the particles in a substance are moving. (.....)

4 Complete the following sentences:

1.  3 kilograms = grams.
2.  Half liter = mL.
3.  Iron rust is an example of the properties of matter.
4.  Color, taste, and smell are from the properties of matter.
5. When you fold a piece of paper, its doesn't change.
6. The temperature increases when the speed of moving particles in matter

5 Cross out the odd word:

1. mL – Liter – Gram – Cm^3 (.....)
2. Burning – Color – Odor – Shape (.....)
3. Milliliter – Measuring cup – Cubic centimeter – Liter (.....)
4. Iron nail – Plastic spoon – Rock – Wood (.....)
5. Cork – Stone – Wood – Plastic (.....)

6 Classify the following properties into physical or chemical:

(Burning of wood – White color of sugar – Spicy taste of pepper
– Sinking in water – Texture of sand – Rusting of iron – Vinegar odor)

Physical Properties	Chemical Properties

7 Look at the following figures, then choose the correct answer:



Figure (1)



Figure (2)



Figure (3)



Figure (4)

- If 150 g of a sheet of paper is folded into an origami boat as shown in figure (1), the mass of the boat be
 (a) 50 g (b) 100 g (c) 150 g
- The mass of 1,000 pieces of the object in figure (2) equals the of one liter of water in figure (3).
 (a) volume (b) mass (c) shape
- When you cut the orange in figure (4) into two halves, the mass of each half will be the mass of the original one.
 (a) less than (b) more than (c) equal to
- One kilogram of the object in figure (1) has one kilogram of the object in figure (2).
 (a) the same volume as (b) smaller volume than
 (c) greater volume than

8 Give a reasons for:

1. The rusting of iron is an example of a chemical property.

(Cairo 2023)

2. Temperature of matter depends on the speed of its particles.

3. You can separate a mixture of sand and iron nails by using a magnet.

9 What happens if:

1. You burn a piece of paper?

2. The particles of matter move faster? (According to the matter temperature)

3. A wet iron nail is left in the air for a long time?

4. You put a wooden cube and a metallic spoon in a container of water?

5. You approach a magnet to some paper clips?

Lesson 4

Activity 8 Useful Properties of Matter

» In this activity, we will study the useful properties of some materials.

1 Helium

Physical Property

- It is a light gas.
(Lighter than air)

• أخف وزنًا من الهواء.

Chemical Properties

- 1 It is not poisonous.
- 2 It is not flammable.

1 غير سام. 2 غير قابل للاشتعال.

A flammable material
could be burned.

Uses of Helium



It is used to fill balloons.



It is used to fill blimps.

Give a reason for:

- 1 Balloons and blimps filled with helium gas rise up in the air.
 - Because helium gas is lighter than air.
- 2 Humans use helium gas safely.
 - Because helium gas is not flammable or poisonous.

2 Copper

Physical Properties

- 1 • It is a good conductor of **heat** and **electricity**.

• يعتبر النحاس موصلًا جيدًا للحرارة والكهرباء.

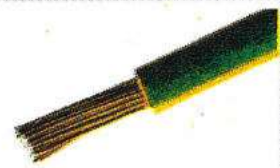
- 2 • It can be stretched into **thin, flexible** wires.

• يمكن تشكيل النحاس على شكل أسلاك رفيعة ومرنة.

Uses of Copper

- 1 It is used in making electrical wires. **G.R**

Because copper is a good conductor of **electricity** and can be stretched into thin, flexible wires.



- 2 It is used in making the body of cooking pans. **G.R**

Because copper is a good conductor of **heat**.



Conduction

It's the ability of a material to transfer heat and conduct electricity.

التوصيل: هو قدرة المادة على نقل الحرارة وتوصيل الكهرباء خلالها.

Give a reason for:

- The handles of cooking pots are made of plastic or wood.

- Because plastic and wood are bad conductors of heat.

What happens if:

- You touch the handles of cooking pots made of metals?

- Your hands are burned because metals are good conductors of heat.

Check your understanding?

» Put (✓) or (x):

- 1 The handles of cooking pans are made up of copper. ()

- 2 Helium gas is heavier than air. ()

Activity 9 Uses of Matter

» Knowing properties of each matter helps us know the best way to use it.

» The table shows different matters with their properties and uses:

Matter	Physical Properties	Uses (It is used in making)
① Steel	• Hard • Strong	  • Screwdrivers • Hammers
② Glass	• Transparent • Smooth	   • Windows • Eyeglasses • Light bulb
③ Rubber	• Waterproof • Flexible	   • Athletic shoes • Gloves • Tires



Check your understanding?

» Mention one use for each of the following substances:

① Glass:

② Rubber:

③ Copper:

④ Steel:

Activity 10 Record Evidence Like a Scientist

Concept 2

» In this concept, you have learned about matter and how describing and measuring it

**Question:**

» How is matter described and measured?

**My Claim:**

**Evidence:**

**Scientific Explanation with Reasoning:**

Pony Exercises on

Lesson Four

Answered

1 Choose the correct answer:

1. All the following are properties of helium, except that

(a) it is lighter than air	(b) it is not poisonous
(c) it is not flammable	(d) It is heavier than air
2. Steel is used in making hammers because it is (Cairo 2024)

(a) flexible	(b) smooth	(c) hard	(d) transparent
--------------	------------	----------	-----------------
3. The material used in making the body of cooking pans is (Cairo 2023)

(a) copper	(b) glass	(c) wood	(d) helium
------------	-----------	----------	------------
4. is used to make electrical wires due to its properties. (Alex. 2023)

(a) Glass	(b) Wood	(c) Helium	(d) Copper
-----------	----------	------------	------------
5. Glass is transparent, so it is used in making (Minia 2023)

(a) screwdrivers	(b) eyeglasses	(c) gloves	(d) tires
------------------	----------------	------------	-----------
6. You burn a match safely near a helium balloon because helium is, which is considered a property of it.

(a) a poisonous gas – chemical	(b) a flammable gas – physical
(c) not a flammable gas – chemical	(d) a flammable gas – chemical
7.  is used in making car tires.

(a) Copper	(b) Helium	(c) Rubber	(d) Glass
------------	------------	------------	-----------
8. All the following are properties of rubber, except that it

(a) is used in making gloves	(b) has a definite shape and volume
(c) is flexible	(d) is not waterproof
9. Copper is used in making electrical wires because it is

(a) a good conductor of heat	(b) not flexible
(c) a good conductor of electricity	(d) hard and strong

10. A light bulb is made of because it is material.

- Ⓐ glass – an opaque Ⓑ rubber – a transparent
Ⓒ copper – a transparent Ⓓ glass – a transparent

2 Put (✓) or (x):

- Helium takes the shape and volume of its container. (Menofia 2023) ()
-  A balloon filled with helium gas rises up in the air. ()
- Helium gas can be used safely because it is poisonous. (Cairo 2024) ()
- Handles of cooking pans are made up of wood or plastic. (Gharbiya 2023) ()
- Wood is a transparent material used in making eyeglasses. (Oalyubia 2023) ()
- Rubber is used in making gloves and windows. (Menofia 2024) ()
- Screwdrivers are made of steel because it is hard and strong. ()
- Copper is used in making cooking pans because copper is a good conductor of electricity. (Giza 2024) ()

3 Write the scientific term:

- A non-poisonous gas used in filling balloons. (Ismailia 2023) (.....)
- A transparent material used in making windows and eyeglasses. (.....)
- A metal stretched into thin and flexible electrical wires. (.....)
-  The ability of matter to transfer heat or electricity. (.....)

4 Complete the following sentences:

- is used to fill balloons that rise up in air as it is lighter than (Oalyubia 2024)
- is used in making hammers, while is used in making athletic shoes.
- Windows are made of because it is a material.
- The body of cooking pans can be made of while their handles can be made of or plastic. (Cairo 2023)
- is used in making gloves because it is and

5 Look at the following figures, then complete the sentences below:



Figure (1)



Figure (2)

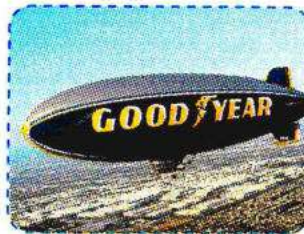


Figure (3)



Figure (4)

1. The objects in figures (.....) and (.....) are made of the same material.
2. The object in figure (2) is made of because it is and
3. The blimp in figure (3) is filled with gas because it is lighter than

6 Give a reason for:

1. Helium is used to fill balloons and blimps.
.....
.....
2. Copper is used in making electrical wires.
.....
.....
3. The body of cooking pots is made of copper, while the handles are made of plastic or wood.
.....
.....
4. Rubber is used in making gloves and tires.
.....
.....

5. Glass is used in making electric lamps.

7 What happens if:

1. Blimps are filled with helium gas?

[Assiut 2023]

2. The handles of cooking pots are made of copper?

8 Mention one use of each of the following:

1. Helium.

2. Rubber.

3. Steel.

4. Copper.

Concept

2.3

Comparing Changes in Matter



Concept 3

Comparing Changes in Matter

Lesson 1

Activity 1 Can You Explain?

Activity 2 Melting Matter

Activity 3 Particles

Lesson 2

Activity 4 Temperature and State of Matter

Activity 5 What's the Matter? Changing States

Lesson 3

Activity 6 Mixtures

Activity 7 Mixing It Up with Mass

Lesson 4

Activity 8 Physical Changes in Our Lives

Activity 9 Chemical Changes

Activity 10 How Has It Changed?

Lesson 5

Activity 11 Record Evidence Like a Scientist

Activity 12 Plenty of Water, but None to Drink

Glossary

Lesson (1)

Activity (1)			
Mass	كتلة	Mixing	خلط
Activity (2)			
Melting	عملية الانصهار	Heating	تسخين
Activity (3)			
Thermal energy	الطاقة الحرارية	Warming houses	تدفئة المنازل
		Spin	تدور
		Vibrate	تهتز

Lesson (2)

Activity (4)			
Lose	تفقد	Gain	تكتسب
Physical change	تغير فيزيائي	Reversible	عكسية
Activity (5)			
Steam	بخار	Separate	تنفصل
Condensation	عملية التكثف	Spread out	تنتشر
		Evaporation	عملية التبخر
		Freezing	عملية التجمد
		Melting point	درجة الانصهار

Lesson (3)

Activity (6)			
Mixture	مخلوط	Compound	مركب
Components (Ingredients)	مكونات	Air (Atmosphere)	الهواء
Activity (7)			
Salt	ملح	Pepper	فلفل أسود
Iodine	اليود	Corn starch	نشأ الذرة
		Oil	زيت
		Vinegar	خل

Lesson (4)

Activity (8)			
Structure	تركيب	Shaping	تشكيل
Bend	يثني	Baker	خباز
Yeast	خميرة	Oven	فرن
Activity (9)			
Layer	طبقة	Shape	شكل
Fire	حريق	Baking soda	بيكربونات الصودا
Activity (10)			
Food coloring	ألوان الطعام	Coiling a wire	لف سلك
		Frying an egg	قلي بيضة
		Butter	زبدة

Lesson (5)

Activities (11 & 12)			
Seawater	مياه البحر	Thirsty	عطشان
Desalination	عملية تحلية مياه البحر	Seaweed	أعشاب بحرية
Safe	آمن	Rises up	يرتفع
		Dehydrate	يشعر بالجفاف
		Shells	أصداف
		Expensive	غالي الثمن
		Ocean	محيط
		Undrinkable	غير صالح للشرب
		Harm	يضر

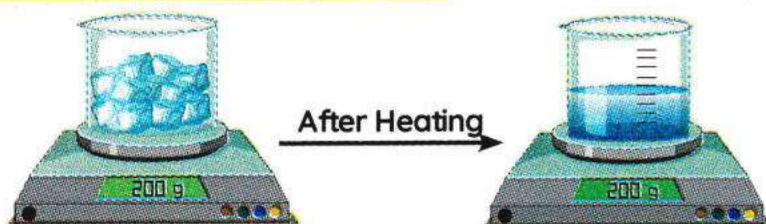
Lesson

1

Activity 1 Can You Explain?

What happens to the **mass** of matter when it is **heated**, **cooled**, or **mixed** with another matter?

Example ①: When heating ice:



- The **state** of matter **changes**.
- The **mass** of matter **doesn't change**.

Example ②: When mixing chocolate and milk:



- The **mass** of milk and chocolate after mixing is equal to the sum of the masses of milk and chocolate before mixing.

From the previous examples, we conclude that:

- The mass of any matter **does not change** when it is **heated**, **cooled**, or **mixed** with another matter.

Check your understanding?

» Put (✓) or (x):

- 1 When ice turns into water, its mass decreases. ()
- 2 The mass of a mixture of nuts is equal to the sum of the mixture components. ()

Activity 2 Melting Matter

» Imagine that you forgot some ice cubes out the freezer, you will observe that ice cubes start to melt and turn into water in a short time.



Melting

It is a process in which matter is changed from a **solid** state into a **liquid** state when its temperature increases (by heating).

عملية الانصهار: هي عملية تغير المادة من الحالة الصلبة للحالة السائلة عن طريق زيادة درجة الحرارة (التسخين).

NOTE:

• Solid matter, such as ice and ice cream, must be kept below a **certain temperature** to stay in its **solid state**.

• يجب حفظ المادة الصلبة مثل الثلج والآيس كريم بدرجة حرارة أقل من درجة الحرارة المحددة للبقاء في الحالة الصلبة.



Check your understanding?

» **Observe what happens to ice cubes in the two containers and then complete the sentences using the word bank:**

quickly

slowly

decreases

increases



Figure (1)



Figure (2)

- 1 The ice in figure (1) melts and turns into water
- 2 The ice in figure (2) melts and turns into water
- 3 As the temperature of a substance, it melts faster.

Activity 3 Particles

Thermal energy

- » Heat is not physical thing (matter).
- » Heat is a form of energy known as "Thermal energy".
- » The thermal energy from the sun keeps living organisms on Earth alive.

• الحرارة ليست شيئاً مادياً (مادة).

• الحرارة هي شكل من أشكال الطاقة يُعرف باسم «الطاقة الحرارية».

• الطاقة الحرارية القادمة من الشمس تساعد الكائنات الحية في الأرض على البقاء على قيد الحياة.

Thermal energy can be used in:

Warming houses



Cooking food



Particles in motion

- » When particles inside matter absorb thermal or light energy:

The particles move, spin, and vibrate **faster**.



The kinetic energy of particles **increases**.



The matter becomes **warmer**.



عندما تمتص جسيمات المادة طاقة حرارية أو ضوئية:

• تتحرك وتهتز الجسيمات داخل المادة بشكل أسرع.

• تزداد الطاقة الحركية للجسيمات.

• تصبح المادة أكثر سخونة.

What happens if:

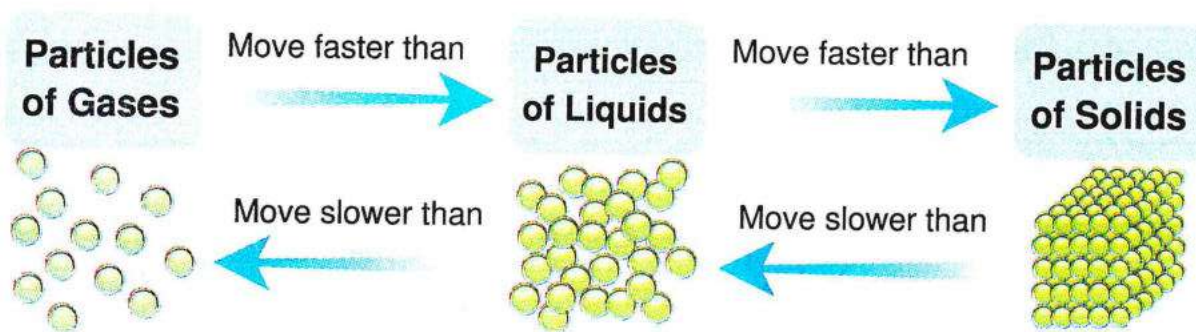
① Matter is heated?

- Particles move **faster** and spread out (become **far from** each other).

② Matter is cooled?

- Particles move **slower** and get **closer** to each other.

» The speed of particles of gases, liquids, and solids is different.



Check your understanding?

» Put (✓) or (x):

- Heat is considered a matter because it has a mass and volume. ()
- Particles of liquids move slower than particles of solids. ()
- When water gain thermal energy, the kinetic energy of its particles increase. ()
- Living organisms on Earth need thermal energy from the sun to survive. ()

Lesson One

Answered

1 Choose the correct answer:

- Which of the following matter's particles are very close together? (Ismailia, Alex. 2023)
 (a) Air. (b) Water. (c) Oil. (d) Wood.
- When water is heated, its particles (Damietta 2023)
 (a) move slower (b) move faster
 (c) move with the same speed (d) don't move
- Ice turns into water by (Cairo, Dakahlia 2023)
 (a) heating (b) rusting (c) freezing (d) cooling
-  The mass of ice after melting is its mass before melting.
 (a) double (b) greater than (c) equal to (d) less than
- All the following occur to the particles of oil when it is heated, except that they (Gharbia 2023)
 (a) vibrate faster (b) spin around faster
 (c) vibrate less (d) move faster
- When 500 grams of ice are melted, its mass becomes grams.
 (a) 400 (b) 600 (c) 100 (d) 500
-  The mass of the components of a mixture before mixing is its mass after mixing.
 (a) greater than (b) equal to (c) smaller than (d) double

2 Put (✓) or (X):

- When particles of a matter absorb thermal energy, they move slower. (Alex 2023) ()
- If we increase the temperature of ice, it melts. (Beni Suef 2023) ()
- Melting is the change of matter from a solid state to a liquid state. (Cairo 2023) ()
- When you keep ice cubes in the freezer, they turn into water. ()
- All particles of matter are in a state of motion. ()
-  Heat is a form of energy. ()
-  Changing the temperature affects the shape and mass of matter. ()

3 Complete the following sentences:

1. When ice is melted, it changes from a state to a state. (Cairo 2023)
2. When particles of matter gain thermal energy, their motion become (Ismailia 2023)
3. is the change of matter from a solid state to a liquid state. (Giza 2023)
4. We use energy in and warming houses.
5. When substances are cooled or heated, their do not change.
6.  Heat is one of the forms of

4 Write the scientific term:

1. The process by which matter is changed from a solid state to a liquid state. (Cairo 2024) (.....)
2. The source of thermal energy that is necessary for the survival of living organisms on Earth. (.....)
3. The state of ice after being melted. (.....)

5 Give a reason for:

1.  Heat is not a matter.

.....

.....

2. A chocolate bar melts when we put it in a warm place.

.....

.....

6 What happens to:

1.  The mass of ice cubes placed in a container, when these ice cubes melt?

.....

.....

2. The motion of water particles if an amount of water is heated? (Giza 2023)

.....

.....

7 Look at the following figures, then choose the correct answer:

- A** The two balloons are filled with helium gas, and one of them is put in a warm room and the other in a cold room.



Balloon (a)



Balloon (b)

..... is put in a warm room because helium particles

- (a) Balloon (b) – are closer to each other
- (b) Balloon (b) – are spread out from each other
- (c) Balloon (a) – are spread out from each other

B

1. On heating matter (a),

- (a) it turns into matter (b)
- (b) its particles vibrate slower
- (c) the distance between its particles increases



Matter (a)



Matter (b)

2. On heating matter (b),

- (a) it turns into matter (a)
- (b) its particles vibrate slower
- (c) its temperature decreases

3. When matter (b) is kept in a cold temperature,

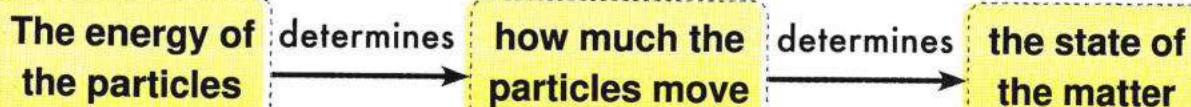
- (a) it turns into matter (a)
- (b) its mass decreases
- (c) it remains as it is

Lesson

2

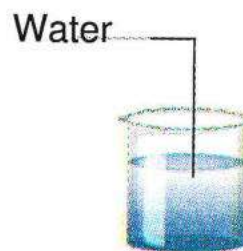
Activity 4 Temperature and State of Matter

» The state of matter is affected by the change in its temperature, where:

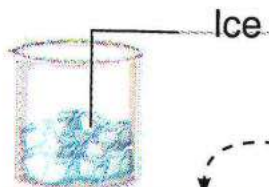


Example: Changes of states of water

Water is still liquid between 0°C and 100°C .



Steam



What happens when



Water is cooled below 0°C ?

Its particles **lose** energy.

So they move **slower**.

Water turns into ice.

Water is heated above 100°C ?

Its particles **gain** energy.

So they move **Faster**.

Water turns into steam.

NOTES:

- 0°C is the **freezing point** of water.
- 100°C is the **boiling point** of water.
- $^{\circ}\text{C}$ is the measuring unit of **temperature**.

Temperature and states of matter

Melting



By heating a solid matter.

Its particles **gain** energy.

So they move **faster**.

Their temperature **increases**.

So it changes into a **liquid matter**.

Freezing



By cooling a liquid matter.

Its particles **lose** energy.

So they move **slower**.

Their temperature **decreases**.

So it changes into **solid matter**.

Concept 3

» The change in the **state** of matter is a “**physical change**”.

Physical change

It is a change in the **shape**, **size**, or **state** of matter without any change in its structure.

التغير الفيزيائي: هو التغير في شكل أو حجم أو حالة المادة دون أي تغيير في تركيبها.

» Physical changes are also usually **reversible**, for example:

The **melting process** is the reverse of the **freezing process**.

تعتبر التغيرات الفيزيائية من العمليات العكسية؛ حيث تعتبر عملية الانصهار عكس عملية التجمد.



Check your understanding?

» Put (✓) or (x):

- 1 Particles of ice gain energy and move faster on cooling. ()
- 2 The state of matter depends on its temperature. ()

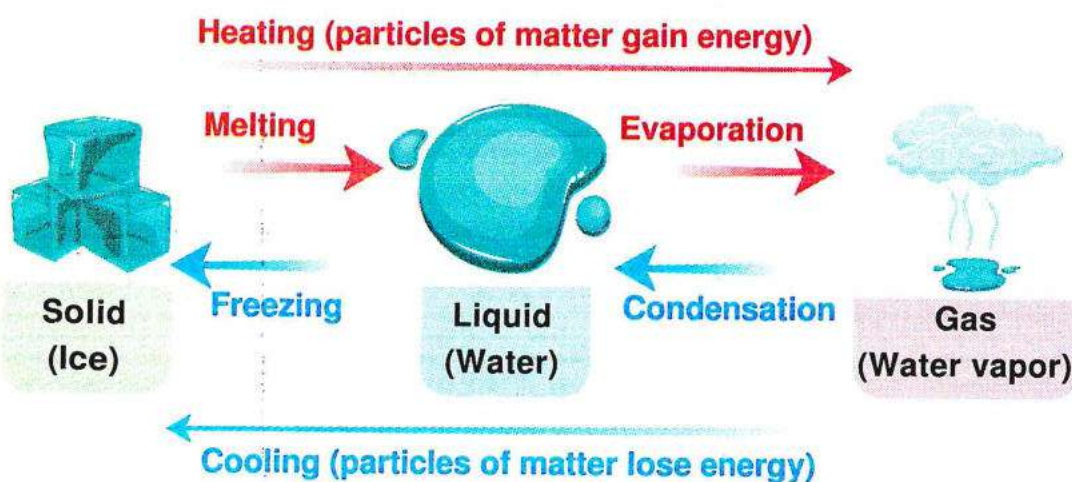
Activity 5 What's the Matter? Changing States

» In this activity, we will study changing states of water as an example of changing of states of matter.

» Water exists in three states which are:

- 1 Solid state (ice).
- 2 Liquid state (water).
- 3 Gas state (water vapor or steam).

» We can summarize changing states of matter in this diagram:



From the previous, we can conclude that:

» Water changes from one state to another when it **gains** or **loses** thermal energy.

Melting and **evaporation** are processes that occur when particles of matter **gain (absorb)** thermal energy.

Freezing and **Condensation** are processes that occur when particles of matter **lose (release)** thermal energy.



Melting

A process in which matter changes from a **solid** state to a **liquid** state by **heating**.

Ex: Ice cube is left out the freezer.

The ice cube **gains** thermal energy.



The particles of ice move **faster**.



The particles **separate from each other**.



This causes ice to change from **solid state** into **liquid state**.



Freezing

A process in which matter changes from a **liquid** state to a **solid** state by **cooling**.

Ex: A bottle of water is placed in the freezer.

The water **loses** thermal energy.



The particles of water move **slower**.



The particles **get closer together**.



This causes water to change from **liquid state** into **solid state**.



Evaporation

A process in which matter changes from a **liquid** state to a **gas** state by **heating**.

Ex: Putting a pot of water on a hot stove.

The water **gains** thermal energy.



The particles of water move **faster**.



The particles **separate more from each other**.



This causes water to change from **liquid state** into **gas state**.



Condensation

A process in which matter changes from **gas** state to **liquid** state by **cooling**.

Ex: Hot water vapor touches a cold lid.

The water vapor **loses** thermal energy.



The particles of water vapor move **slower**.



The particles **get closer together**.



This causes water vapor to change from **gas state** into **liquid state**.

The difference between water vapor and steam:

Water vapor	Steam
It is invisible.	It is visible.
It forms directly when water boils.	It forms when water vapor hits cooler air; it condenses into tiny droplets which look like small white clouds.

Give a reason for:

① **Formation of water drops when water vapor touches a cold surface.**

- Because water vapor condenses and changes from gas state into liquid state.

② **Although water vapor is invisible, we see steam during cooking.**

- Because when water vapor hits cooler air, it condenses into tiny droplets which look like small white clouds.



Check your understanding?

» Put (✓) or (X):

- 1 When ice is heated, it melts. ()
- 2 Particles of matter gain energy during melting and freezing processes. ()
- 3 The particles of steam move slower than the particles of water. ()
- 4 Melting and freezing are two opposite processes. ()

Lesson Two

Answered

1 Choose the correct answer:

1.  Liquid chocolate is returned back into its solid state by
 (a) heating (b) cooling (c) evaporation (d) condensation
2.  is the change of matter from the gas state to the liquid state.
 (a) Freezing (b) Evaporation (c) Condensation (d) Melting (Alex. 2024)
3.  The process of freezing is the reverse process of
 (a) boiling (b) melting (c) condensation (d) evaporation
4. When ice cream melts, all the following properties don't change, except its
 (a) mass (b) taste (c) color (d) state
5. When chocolate melts, all the following occur, except that
 (a) its particles move at a higher speed
 (b) its particles get closer to each other
 (c) its particles are separated away from each other
 (d) its temperature increases
6. Ice cubes melt when they gain energy. (Qalyubia 2024)
 (a) sound (b) thermal
 (c) electrical (d) magnetic
7. Changing ice into water is called process. (Helwan 2024)
 (a) melting (b) evaporation
 (c) condensation (d) freezing
8. Water becomes when it is cooled below 0°C .
 (a) solid (b) liquid (c) gas (d) vapor
9. When we boil an amount of water, it (Cairo 2024)
 (a) condenses (b) freezes
 (c) melts (d) evaporates
10. is the process by which water changes into ice. (Dakahlia 2024)
 (a) Melting (b) Freezing
 (c) Evaporation (d) Condensation

11. Water vapor into water droplets when it touches a cold surface.
 (a) melts (b) condenses (c) evaporates (d) freezes
12. Ice turns into water by (Cairo, Dakahlia 2023)
 (a) heating (b) freezing (c) cooling (d) evaporation
13. Melting is a physical change that is the reverse of
 (a) heating (b) freezing (c) evaporation (d) condensation
14. The particles inside matter lose energy during the process.
 (a) melting (b) heating (c) evaporation (d) condensation
15. In cold weather, drops of water are on the windows of the house. (Giza 2023)
 (a) evaporated (b) condensed
 (c) melted (d) frozen
16. When you put a bottle of water in the freezer, the particles of water
 (a) move faster (b) lose energy
 (c) gain energy (d) become more free
17. Matter changes from a gas state into a liquid state when it
 (a) absorbs energy (b) loses particles
 (c) releases energy (d) is heated

2 Put (✓) or (X):

1. By decreasing the temperature of matter, the speed of its particles increases. (Cairo 2023) ()
2.  Melting is the transformation of ice into water. ()
3.  When a liquid matter is heated, it turns into a solid state. ()
4. Melting is considered a physical change because the structure of matter doesn't change. ()
5. In both condensation and freezing processes, matter releases energy. ()
6. When particles of matter move at a high speed, the matter temperature decreases. (Cairo 2023) ()
7. During the condensation process, the movement of matter particles decreases. ()

8. When water vapor touches a cold soda can, it evaporates and changes into a solid state. ()

3 Correct the underlined words:

1. Melting and freezing are irreversible processes. (.....)
2. 100°C is the freezing point of water. (.....)
3. Changing the state of matter is considered a chemical change. (.....)
4. When you put a bottle of water in the freezer, its temperature increase. (.....)

4 Write the scientific term:

1. They are the changes in matter that are usually reversible and don't affect the matter structure. (Damietta 2023) (.....)
2. The measuring unit of temperature. (.....)
3. The process in which the particles of a liquid matter gain thermal energy and change into a gas. (.....)
4. The process in which water vapor changes into water drops on hitting a cold surface. (.....)
5. The process in which matter changes from a liquid state into a solid state by cooling. (.....)
6. The state of water when its temperature is between 0°C to 100°C . (.....)

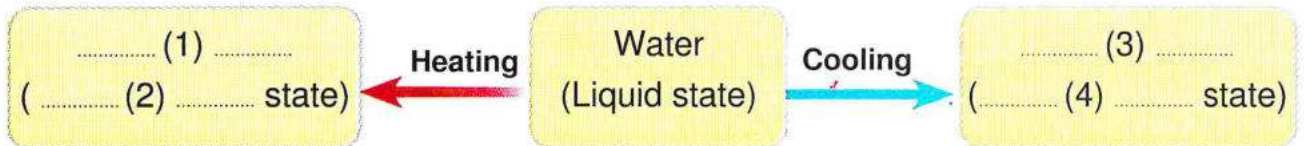
5 Complete the following sentences:

1. Changing water from a solid state to a liquid state is called while changing water from a gas state to a liquid state is called (Cairo 2023)
2. Melting is the change in the state of matter from a into a
3. Matter is changed from a state to another by changing its (Alex. 2023)

4. The freezing point of water is [Assiut 2023]
5.  Water turns into steam as a result of thermal energy.
6. Water remains between 0°C and 100°C .
7.  A matter changes from a solid state to a liquid state when it thermal energy.
8. is formed when water vapor touches cooler air.
9. When you decrease the temperature of water below 0°C , its particles get to each other, and water changes into

6 Complete the following diagram:

[Minia 2023]



7 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. Melting	Ⓐ is the change of matter from a solid state to a liquid state. [Alex. 2024]
2. Freezing	Ⓑ is the change of matter from a liquid state to a gas state.
3. Condensation	Ⓒ is the change of water from a gas state to a liquid state. [Cairo 2024]
4. Evaporation	Ⓓ is the change of water from a liquid state to a solid state. [Cairo, Alex. 2024]

1. 2. 3. 4.

8 In the opposite figure:

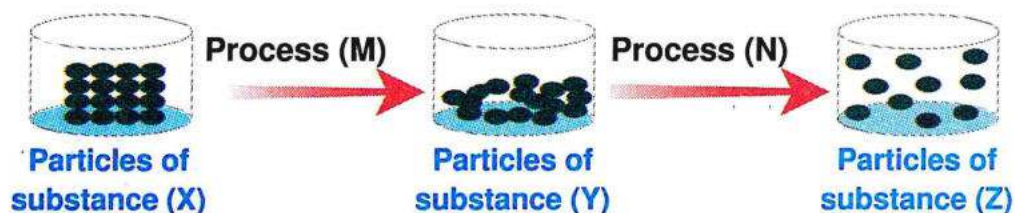
Some ice cubes are placed on a jar containing boiling water:

**A Choose the correct answer:**

- After short time, ice cubes and turn from a solid state into a state.
 (a) condenses – gas (b) evaporates – liquid
 (c) melts – liquid
- The steam formed in process (1) resulted from the
 (a) condensation of water vapor (b) evaporation of water
 (c) freezing of water vapor
- In process (2), the particles of water and water turns into water vapor.
 (a) move with low speed (b) get closer to each other
 (c) get more separated away from each other
- Which process isn't included in this figure?
 (a) Melting (b) Freezing (c) Condensation

B Put (✓) or (X):

- Ice cubes start to melt when its temperature becomes below 0°C . ()
- Process (1) is reverse to process (2). ()
- During process (1), the spaces between the water vapor particles increases. ()

9 Study the following figure, then choose the correct answer:

- X is a solid state - Y is a liquid state - N is the freezing process.
- Y is a liquid state - Z is a solid state - M is the evaporation process.
- Y is a liquid state - Z is a gas state - M is the condensation process.
- X is a solid state - Z is a gas state - M is the melting process.

10 Give a reason for:

1. When the temperature of ice cubes increases, they melt.

(Dakahlia 2023)

.....

.....

2. Although water vapor is invisible, we see steam during cooking.

(Gharbia 2024)

.....

.....

3. The melting of some ice cubes is considered a physical change.

.....

.....

11 What happens when:

1. You put a cup of water in the freezer?

(Alex. 2023)

.....

.....

2. Water vapor touches a cold surface?

.....

.....

3. Water temperature is decreased below 0°C ?

.....

.....

Lesson

3

Comparing Changes in Matter

Activity 6 Mixtures

Concept 3

» Put (✓) or (X):

- 1 The color of strawberries in salad changes. ()
- 2 The taste of sugar doesn't change after dissolving it in water. ()

**Most things in nature are mixtures,
where there are other things called compounds.**

Mixture

It is a form of matter made of two or more substances that **do not combine chemically**.

When substances are mixed together, they **do not form** a new substance.

Ex: • Salty water • Salad

Compound

It is a form of matter made of two or more substances that **combine chemically**.

When substances combine together, they **form** a new substance.

Ex: • Water • Carbon dioxide

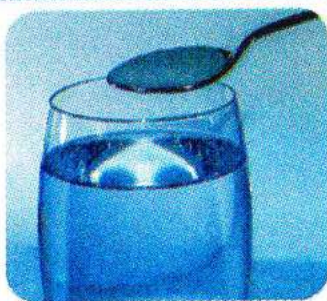
A mixture can be made of:

Solid Materials



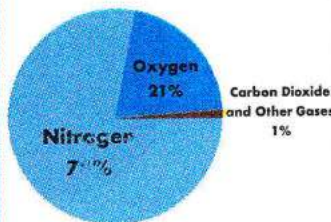
Example:
Sand and rocks

Solid and Liquid Materials



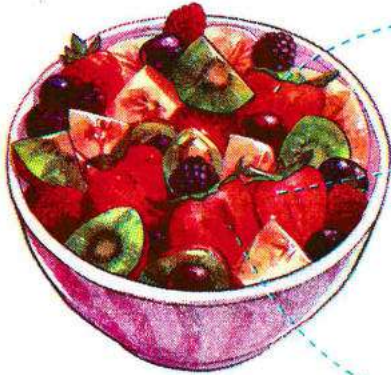
Example:
Salty water

Gas Materials



Example:
Air (Atmosphere)

Properties of Mixtures:



The mixture components do not combine chemically together.

Ex: Strawberries don't react with kiwi.

Each component in the mixture keeps its own properties.

Ex: The taste of each fruit doesn't change.

The components of the mixture can be separated from each other after mixing.

Ex: You can separate a piece of strawberry out from a fruit salad.

خواص المخاليط:

3 يمكن فصل مُكوّنات المخلوط.

2 تحتفظ مُكوّنات المخلوط بخصائصها.

1 لا تتحد مُكوّنات المخلوط كيميائيًا.

Give a reason for:

① The components of a mixture are separated easily from each other.

- Because the mixture components don't combine chemically together.

② Sugar doesn't lose its sweetness after dissolving it in water.

- Because no new substance is formed as the mixture components don't combine chemically together.



- The components of some mixtures **can be seen** by the eyes, such as in a **mixture of nuts**.



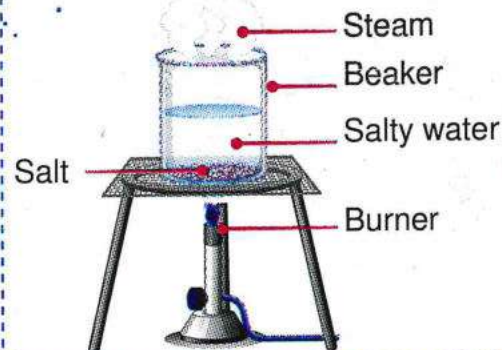
- The components of some other mixtures **cannot be seen** by the eyes, such as in **air components**.

Separating Mixtures

» There are many methods to separate the components of mixtures, such as:

1 Evaporation

» It is a process used to separate solid material that dissolves in a liquid by **heating**.

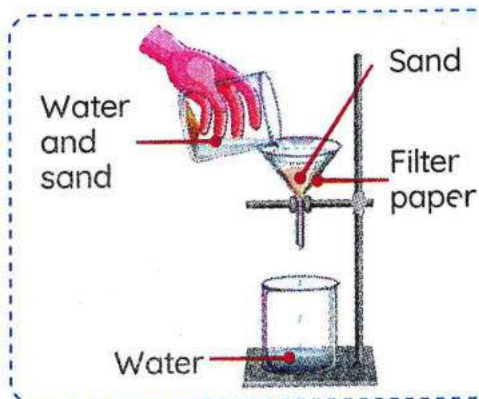


Example:

- It is used to separate **salt** from **salty water**.
- By heating salty water, water evaporates leaving the salt in the beaker.

2 Filtration

» It is a process used to separate solid material that doesn't dissolve in a liquid by using a **filter paper**.



Example:

- It is used to separate **sand** from **mixture of sand and water**.
- Filter paper separates sand, while water passes through it.

Check your understanding?

» Put (✓) or (x):

- 1 Each component in the a mixture keeps its own properties after mixing. ()
- 2 Filtration helps us separate salt from salty water. ()

Activity 7 Mixing It Up with Mass

» In this Experiment, you will explore what happens to masses of different substances when you mix them together.

في هذا النشاط، ستكتشف ماذا يحدث لكتل المواد المختلفة عند خلطها ببعضها.

Experiment 1 Forming Mixtures

Tools: • Salt – Pepper – Oil – Water – Balance – Spoon

Step (1): Mixing solid materials:

- Mix 10 grams of **salt** and 10 grams of **pepper**, then find the mass of the mixture.

10 g

Salt

+

10 g

Pepper

=

20 g

A mixture of salt and pepper



Mixture (1)

Step (2): Mixing liquid materials:

- Mix 10 grams of **water** and 10 grams of **oil** with a spoon, then find the mass of the mixture.

10 g

Water

+

10 g

Oil

=

20 g

A mixture of water and oil



Mixture (2)

Step (3): Mixing solid and liquid materials:

- Mix 10 grams of **salt** and 10 grams of **water** with a spoon, then find the mass of the mixture.

10 g

Salt

+

10 g

Water

=

20 g

A mixture of salty water



Mixture (3)

Observations:

- ① The sum of the substances' masses before mixing is equal to the sum of their masses after mixing.
- ② The properties of the substances don't change after mixing.

Conclusions:

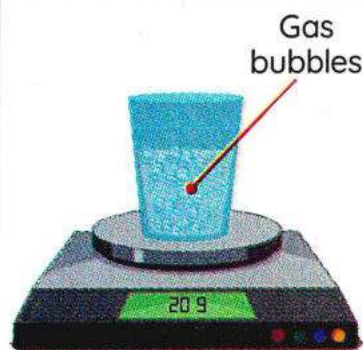
- » The properties of the substances in a mixture **don't change**. **GR**
Because they **don't combine** chemically together.
- » The masses of the substances **don't change** if they are mixed with other substances to form a mixture.

Experiment 2 Forming Compounds**Tools:**

- Vinegar – Baking soda – Iodine – Cornstarch – Balance – Spoon

Step (1):

- Mix 10 grams of **vinegar** and 10 grams of **baking soda** with a spoon, then weigh the mass of the mixture.

**Observations:**

- ① The sum of the substances' masses before mixing is equal to the sum of their masses after mixing.
- ② The properties of the substances **change** after mixing due to the formation of a **gas** that causes bubbles.

Step (2):

- Mix 10 grams of **cornstarch** and 10 grams of **iodine** with a spoon, then weigh the mass of the mixture.



Observations:

- The sum of the substances' masses before mixing is equal to the sum of their masses after mixing.
- The properties of the substances **change** after mixing due to the formation of a new compound with a dark blue color.

Conclusions:

- » The properties of the substances in a compound **change**. **G.R**
Because they **combine** chemically together.
- » The masses of the substances **don't change** if they are mixed with other substances to form a compound.

Sum of masses of the substances
(Before mixing)

=

Sum of masses of the substances
(After mixing)



Check your understanding?

» Choose the correct answer:

When you mix 15 grams of salt with an amount of sugar, the mass of the mixture becomes 25 grams, so the mass of sugar is (40 – 10) grams.

Lesson Three

Answered

1 Choose the correct answer:

- Salt can be separated from salty water by (Damietta 2023)
 (a) melting (b) evaporation (c) filtration (d) condensation
- is an example of a mixture of solid materials.
 (a) Salty water (b) Nuts mixture
 (c) Atmospheric air (d) Oil and vinegar mixture
- On adding iodine solution to starch, a is formed.
 (a) dark blue-colored compound
 (b) dark green-colored mixture
 (c) dark blue-colored mixture
 (d) dark green-colored compound
- On adding vinegar to, a gas is formed.
 (a) cornstarch (b) water (c) oil (d) baking soda
- To separate sand only from salty water, we use the process. (Cairo 2023)
 (a) melting (b) evaporation
 (c) filtration (d) freezing
- After mixing and, a new substance is formed.
 (a) salt – water (b) iodine – cornstarch
 (c) oil – water (d) salt – sugar
- On mixing 15 grams of salt with an amount of sugar, the total mass of the mixture becomes 25 grams, so the mass of sugar is grams.
 (a) 40 (b) 5 (c) 15 (d) 10

2 Put (✓) or (X):

- The atmosphere is a mixture of different gases. (Helwan 2024) ()
-  A mixture consists of only one substance. ()
- The components of a mixture cannot be separated after mixing. ()
- Filtration and evaporation are ways of mixtures separation. (Cairo, Banha 2023) ()

5. On mixing vinegar with baking soda, a solid substance is formed. ()
6. The mass and color of iodine change after mixing it with cornstarch. ()
7. Salty water is an example of a mixture that composes of solid and liquid materials. ()
8. The properties of water changes after mixing it with some oil. ()
9. A mixture of sand and rocks is made of solid and liquid materials. ()
10. After adding vinegar to baking soda, gas bubbles are formed. ()
11. Filtration separates a mixture if its components have the same size of particles. ()
12. Separating mixtures by evaporation requires raising the temperature. (Giza 2025) ()
13. By mixing some vegetables together their properties change. (Behira 2024) ()

3 Correct the underlined words:

1. Air is considered as a compound. (.....)
2. A compound of two or more substances is separated easily. (Alex. 2023) (.....)
3. Water evaporates at a higher temperature than that of salt. (.....)
4. On adding 20 g of vinegar to 10 g of baking soda, the mass of mixture is 10 g. (.....)
5. When two substances combine physically, a compound is formed. (.....)

4 Write the scientific term:

1.  It consists of two or more mixed substances that are easily separated. (.....)
2. It is the matter that is formed when two or more materials combine chemically. (Assiut 2023) (.....)
3. It is a mixture of different gases that exists everywhere around us. (.....)
4. It is a method that is used to separate sand from a mixture of water and sand. (.....)

5. It is a method that is used to separate salt from a salty water mixture. (.....)

5 Complete the following sentences:

1. Solid salt is separated from a mixture of salt solution by (Dakahlia 2024)

2. To separate mud from salty water we use process. (Alex. 2023)

3. We separate sand from water by process, and salt from water by process. (Menofia 2023)

4.  consists of two or more substances combined chemically.

5.  consists of two or more substances that are not chemically combined.

6 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. Salty water	Ⓐ is a mixture that composes of solid materials only.
2. Vegetable salad	Ⓑ is a liquid mixture.
3. Milk and banana juice	Ⓒ is a mixture exists in a gaseous state. (Banha 2023)
4. Atmospheric air	Ⓓ is a mixture of solid and liquid materials.

1. 2. 3. 4.

7 How can you separate the salt from salty water mixture?

(Dakahlia 2023, Alex. 2023)

.....

.....

.....

8 Study the following figures, then choose the correct answer:

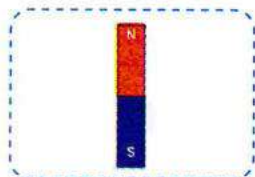


Figure (1)

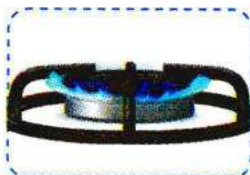


Figure (2)



Figure (3)

- The tool in figure (1) is used to separate a mixture of
 (a) sand and rocks (b) salt and cornstarch
 (c) sugar and salt (d) iron nails and sand
- The tool in figure (2) is used to separate a mixture of
 (a) sugar and salt (b) sand and rocks
 (c) salt and water (d) sand and glass
- The tools in figure (3) are used to separate a mixture of and water, and this method is called
 (a) sugar – evaporation (b) mud – filtration
 (c) salt – filtration (d) sand – evaporation

9 Give a reason for:

- Fruit salad is considered as mixtures.

(Giza 2023)

.....

- The Earth's atmosphere is a mixture.

.....

- Components of a mixture are easily separated.

.....

- Filtration is used to separate sand from water.

.....

5. The color of iodine changes when adding it to cornstarch.

10 What happens when:

1. Salty water is heated for a long time?

(Minia 2023)

2. Adding iodine to cornstarch?

(Gharbia 2023)

3. Adding baking soda to vinegar?

Lesson

4

Activity 8 Physical Changes in Our Lives

» Physical change is a type of changes that may occur to different materials.

» Physical changes can be reversed easily.

- Ice cube melts into water by heating.
- Water freezes into ice by cooling.



Physical Changes:

They are changes in the **size**, **shape**, or even **state** of the matter without forming a new substance (that means without changing in its structure).

التغيرات الفيزيائية: هي تغيرات في حجم أو شكل أو حالة المادة دون تكوين مادة جديدة (أي: دون تغيير في تركيبها).

Examples of a change in matter size:



Cutting fruits to make salad



Cutting paper



Cutting cloth



Cutting wood

Examples of a change in matter state:



Melting wax



Melting ice

Examples of a change in matter shape:



Shaping wood



Shaping metals

Examples of Some Changes in Our Daily Lives

Physical change

Paper



When we **cut paper**, the size of paper changes.

Iron nail



When we **bend an iron nail**, the shape of the iron nail changes.

Food



On **making salad**, the size of ingredients changes, but they have the same taste.

Not a physical change (It is known as chemical change.)



When we **burn paper**, a new substance (ash) is formed.



When an **iron nail rusts**, new matter is formed.



On **making bread**:

- Baker mixes flour, water, sugar and yeast together, then he bakes this dough.
- Bread (new matter) is formed.

Check your understanding?

» Put (✓) or (x)

- 1 The taste of bread is not like its ingredients. ()
- 2 Melting a bar of chocolate is not a physical change. ()

Activity 9 Chemical Changes

» When two substances combine together to produce a new substance, with different properties than the original substances, this is called a “**chemical change**”.

Chemical change

It is a change in the **matter** and its **structure**, producing new matter.

التغير الكيميائي: هو التغير الذي يحدث للمادة وتركيبها، وينتج عنه مادة جديدة.

Examples of chemical changes:

1 Iron rusting:

- **Iron**, **oxygen**, and **water** combines together to form rust.
- Rust is a reddish, thin layer called **iron oxide**.



• الصدأ: يتحد الحديد مع أكسجين الهواء والماء لتكوين طبقة صدأ (قشرة حمراء اللون تُسمى أكسيد الحديد).



2 Burning reaction:

- When **oxygen** combines with **carbon** and **hydrogen**; they release heat that starts a fire.
- The fire changes wood into ash.



• الاحتراق: اتحاد غاز الأكسجين مع الكربون والهيدروجين ينتج عنه حرارة قد تسبب نشوب حريق مثل احتراق الخشب وتحويله لرماد.



3 Mixing vinegar with baking soda:

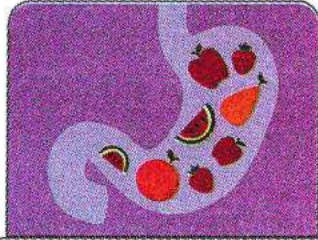
- Mixing **vinegar** with **baking soda** produces gas bubbles.

• عند إضافة الخل لبيكربونات الصودا ينتج فقاعات غازية.

**4 Digestion of food:**

- Chemicals inside your body help in food digestion as a result of chemical changes.

• هضم الطعام: المواد الكيميائية داخل جسمك تساعد في هضم الطعام كنتيجة لتفاعلات كيميائية.

**NOTE:**

- The new substance produced from a chemical change differ in its physical and chemical properties from the original substances.
- Unlike physical changes, chemical changes are **not easily reversed**.

Check your understanding?

» Study the following figures, then classify the changes as **physical or chemical**:



1



2



3



4



5



6

Activity 10 How Has It Changed?

Physical Change

- 1 It is the change in the: shape, size, or state of the matter.
- 2 No new substance is formed.
- 3 It is reversed.

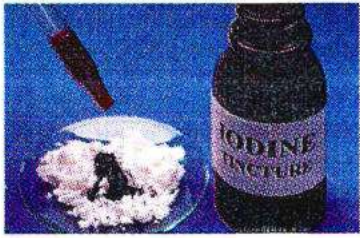
Chemical Change

- 1 It is the change in the structure of the matter.
- 2 A new substance is formed.
- 3 It isn't reversed easily.

Some Evidences that describe physical changes.

			
Water evaporation (A change in matter state)	Coiling a wire to form a spring (A change in matter shape)	Cutting wood (A change in matter size)	Adding a few drops of food coloring to water (An expected change in matter color)

Some Evidences that describe chemical changes.

			
Burning bread in a toaster.	Frying an egg.	Adding iodine to cornstarch forming a new substance with a dark blue color. (An unexpected change in matter color)	Smelling a bad odor of milk and forming chunks when leaving it out of the fridge.

» Read each scenario and observe each figure, then decide whether it describes a **physical** or **chemical** change and mention the **evidence**.

Scenario	Figure	Change	Evidence (Reason)
1 Iron nail rusting			
2 Shaping gold			
3 Sand flowing in an hourglass			
4 Burning paper			
5 Melting butter			
6 Making bread			
7 Making fruit salad			

Lesson Four

Answered

1 Choose the correct answer:

1. All the following change during a physical change, except the of matter.
 (a) color (b) shape (c) structure (d) state
2. Burning of fuel in cars is considered as change(s) of matter. (Menofia 2023)
 (a) a chemical (b) a physical
 (c) physical and chemical (d) a biological
3.  Examples of physical changes include
 (a) iron rusting (b) wood burning
 (c) paper burning (d) making a fruit salad
4. The melting of a cube of ice
 (a) is a chemical change
 (b) isn't a reversible change
 (c) includes a change in its structure
 (d) includes a change in its state
5. The change that occurs during the rusting of iron is the same change produced from (Alex. 2023)
 (a) cutting a piece of cloth (b) breaking of glass
 (c) making bread (d) melting of ice
6. All the following are examples of physical changes, except
 (a) cutting paper (b) burning wood (c) making salad (d) melting wax
7.  A chemical change occurs when a paper.
 (a) folding (b) cutting (c) burning (d) crumbling
8.  is considered a physical change.
 (a) Making bread (b) Crushing a rock
 (c) Iron rust (d) Wood burning
9.  All the following are physical changes, except
 (a) cutting vegetables (b) burning a paper
 (c) cutting cloth (d) melting ice

10. Which of the following is a sign that a chemical reaction has occurred?
- (a) A change in shape. (b) Melting.
(c) Formation of gas bubbles. (d) Condensation.
11. All the following combine together to produce thermal energy to start a fire, except
- (a) carbon (b) iron (c) hydrogen (d) oxygen
12. Mixing and isn't considered as a chemical change.
- (a) baking soda – vinegar (b) oxygen – iron
(c) sugar – water (d) iodine – cornstarch
13.  All the following are chemical changes of matter, except
- (a) burning wood (b) cutting fruit (c) food digestion (d) iron rust
14. All the following changes occur when an orange gets spoiled, except
- (a) a change in its structure (b) forming a new substance
(c) a chemical change (d) a physical change

2 Put (✓) or (X):

1. The formation of rust on an iron nail is an evidence of a chemical change. (Dakahlia 2023) ()
2. Metals rust due to chemical changes that occur to them. (Assiut 2023) ()
3. Chemical changes, as rusting of iron is reversed easily. (Alex. 2023) ()
4.  Grinding sugar is considered a physical change. ()
5. Cutting an orange into two halves causes a change in its taste. ()
6. Frying an egg for breakfast is a physical change. ()
7. Coiling wire to form a spring is an example of a physical change. ()
8. Iron rusts when it combines with hydrogen. (Qalyubia 2024) ()
9.  Melting of wax produces a new substance, so this is considered a chemical change. ()
10. An explosion of fireworks is considered as a physical change. ()

11. Vinegar is separated easily from baking soda after mixing them together.

[Alex. 2023] ()

3 Complete the following sentences:

1. Cutting a paper is a change, while burning it is a change.

[Gharbia 2024]

2. Mixing baking soda with vinegar is considered as a change.

[Gharbiya 2023 - Alex. 2024]

3. Burning of sugar is change while dissolving of sugar in water is change.

[Alex. 2023]

4. Iron rusting is a change, while iron painting is a change.

[Giza 2023]

5.  changes do not change the composition of matter.

6.  The formation of gas bubbles when mixing an amount of vinegar with baking soda is an evidence of a change in the matter.

7.  Digestion of food within the body's cells is a change.

8.  Melting a piece of butter is a change.

4 Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. Physical change	(a) is formed on throwing logs of wood into fire.
2. Chemical change	(b) is a change in matter without change in its structure. [Helwan 2024]
3. Ash	(c) is a reddish layer formed on an iron nail when it rusts.
4. Iron oxide	(d) is a change occurs when mixing two substances and produce a new substance. [Qalyubia 2023]

1. 2. 3. 4.

5 Put the following changes in the correct place in the table below: (Cairo 2024)

(Boiling water – Making fruit salad – Melting wax – Folding clothes
– Burning wood – Cutting paper – Making bread – Burning a toast)

Chemical Changes	Physical Changes

6 Classify the following changes into (physical or chemical) changes:

- 1 Rusting of iron. 2 Cutting wood. 3 Breaking a glass cup.
4 Burning wax. 5 Rotting of fruit. 6 Flowing of sand in an hourglass.

7 Observe the following figures, then complete by using the words below:

(oxygen – hydrogen – chemical – solid – physical – rust – liquid – cooling – water)



Figure (1)



Figure (2)



Figure (3)

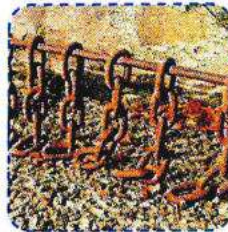


Figure (4)



Figure (5)

- On putting juice in figure (1) in the freezer, it changes from state to state.
- Carbon and react with oxygen to get fire in figure (2).
- The change occurs in figure (3) is reversed by
- Iron chains in figure (4) lose their shining due to reaction with and that forms a layer of
- The change occurred in figure (5) isn't reversed.

8 Give a reason for:

1. Making fruit salad is considered a physical change.

(Cairo 2023)

2.  Burning wood is a chemical change.

3.  Melting of ice cubes is a physical change.

4. Inflating a balloon containing baking soda when putting it on a bottle containing an amount of vinegar.

9 What happens when:

1. Leaving a bottle of milk out the fridge for two days?

2.  When iron is left in the air without coating?

3. Oxygen combines with carbon and hydrogen?

4.  Mixing vinegar and baking soda?

Lesson

5

Comparing Changes in Matter

Activity 11 Record Evidence Like a Scientist

Concept 3



Question:

» What happens to the mass of a substance when it is heated, cooled, or mixed with other substances?



My Claim:



Evidence:



Scientific Explanation with Reasoning:

STEM in Action

Activity 12 Plenty of Water, but None to Drink

» Put (✓) or (X):

- 1 Seawater is safe to drink. ()
- 2 Seawater is a mixture. ()



» All living organisms need fresh water to survive.

» The only water that a thirsty person needs is **fresh water**.

• **Humans cannot drink seawater.** 

Because drinking salt water makes a person's body dehydrate or lose water quickly.

Problem



Many people around the world can't reach fresh water.

Reason



About **70%** of Earth is covered by oceans and seas (salt water).

Solution



We remove salt from seawater by **desalination process**.

A Tricky Mixture:

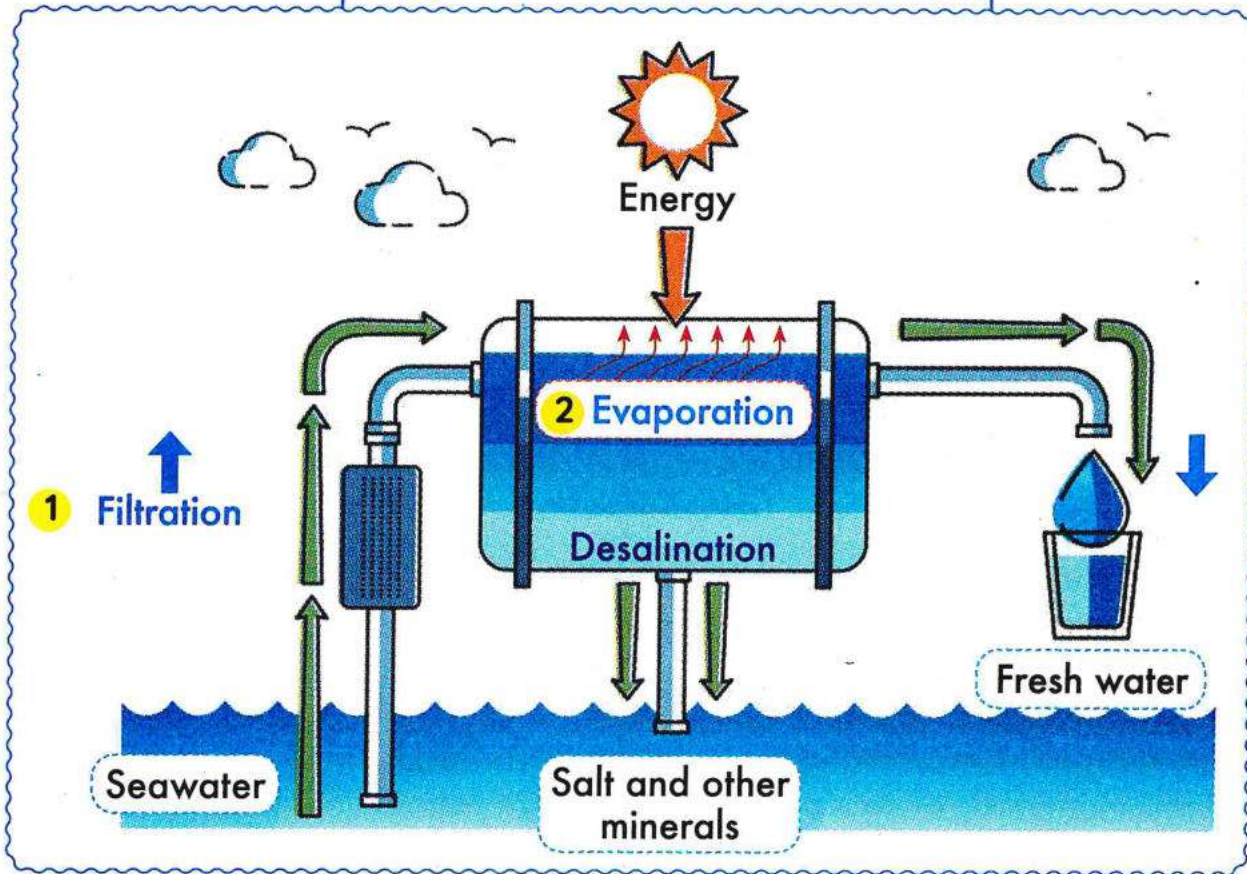


People need fresh water to drink, so they use the **desalination process**.

Desalination Process

It is the process of **removing** salt from water.

Steps of Desalination Process



1 Filtration

Filtration removes any large materials, such as pieces of **seaweed**, **shells**, and **fish**.



Water, **salts**, **minerals**, and **gases** pass through the filter, so the water is still **undrinkable**.

• تقوم عملية الترشيح بالتخلص من المواد الكبيرة مثل: الأعشاب البحرية، والأصداف، والأسماك.

• يمر الماء والأملاح والمعادن والغازات من الفلتر؛ وبالتالي يكون الماء الناتج غير صالح للشرب.

2 Evaporation

When boiling filtered water, water vapor rises up leaving salts and other minerals.



By cooling the rising water vapor, it **condenses** and turns into liquid water that is **safe to drink**.



The remaining water with a large amount of salt and minerals is pumped back into oceans.

• أثناء غليان ماء البحر، يتصاعد بخار الماء من المخلوط وتبقى الأملاح والمعادن. • بتبريد بخار الماء المتصاعد، فإنه يتكثف ويتحول إلى ماء يكون صالحًا للشرب. • يتم ضخ المياه المتبقية مع كمية كبيرة من الأملاح والمعادن إلى مياه المحيطات مرة أخرى.

Disadvantages of Desalination

1

It requires a lot of energy.

2

It is very expensive.

3

It may harm marine organisms.

• Desalination may harm marine organisms. **GR**

- Small marine organisms may be sucked with water into desalination plants.
- The water that contains large amounts of salt is pumped back into the oceans.



• Egypt has **80** desalination plants.

• تمتلك مصر 80 محطة تحلية مياه.



Check your understanding?

» Put (✓) or (X)

- 1 In desalination, water is safe to drink after the filtration process. ()
- 2 Filtration can remove salts and minerals from seawater. ()

Lesson Five

Answered

1 Choose the correct answer:

1. Desalination means removing of from water to drink it. (Cairo 2023)

- (a) oxygen gas
- (b) salt
- (c) sugar
- (d) hydrogen gas

2. of seawater removes pieces of seaweed, shells and fish.

- (a) Boiling
- (b) Freezing
- (c) Filtration
- (d) Condensation

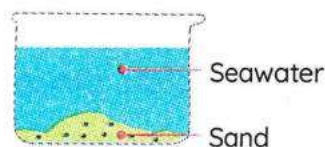
3. The desalination process of seawater includes all the following processes, except the process.

- (a) evaporation
- (b) melting
- (c) condensation
- (d) filtration

4. Water vapor produced from evaporation process of seawater changes into water by

- (a) salty – cooling
- (b) liquid – heating
- (c) liquid – cooling
- (d) fresh – heating

5. If you have filter paper, a glass sheet, and a flame, what is the correct order of operations to be carried out for the sample in front of you to obtain drinkable water?



- (a) Evaporation → Filtration → Condensation
- (b) Evaporation → Condensation → Filtration
- (c) Filtration → Evaporation → Condensation
- (d) Filtration → Condensation → Evaporation

(School book)

6. From the advantages of the desalination process is that

- (a) it requires a lot of energy
- (b) it is very expensive
- (c) it harms small marine organisms
- (d) it extracts drinkable water from seawater

2 Put (✓) or (X):

1. About 70 % of Earth's surface is covered with oceans. ()
2. The water in oceans is considered a compound. ()
3. Desalination is the process of removing salt from water by cooling only. (Cairo 2023 - Gharbia 2024) ()
4. The desalination process includes only the filtration process. (Menofia 2023) ()
5. The filtration process removes fish, shells, and salt from seawater. ()
6.  Seawater water becomes drinkable after the filtration stage. ()
7. Desalination is an expensive process. ()
8. Egypt has more than 80 desalination plants. ()

3 Write the scientific term:

1. The process of removing salt from water. (Alex. 2023) (.....)
2. The process of removing large materials, such as seaweed and shells from seawater. (.....)
3. The process of separating salt and minerals from salt water of sea. (.....)

4 Complete the following by using the words between brackets:

(salt water – gases – dehydrates – minerals – filtration –
evaporation – energy – salt)

1. Seaweed, shells, and fish are removed from ocean's water by process. (Beni Suf 2023)
2. Minerals and are separated from seawater by process.
3. From desalination problems that it requires a lot of
4. Seawater is a mixture of water,, and salts.
5. When you drink, your body faster.

5 Give a reason for:

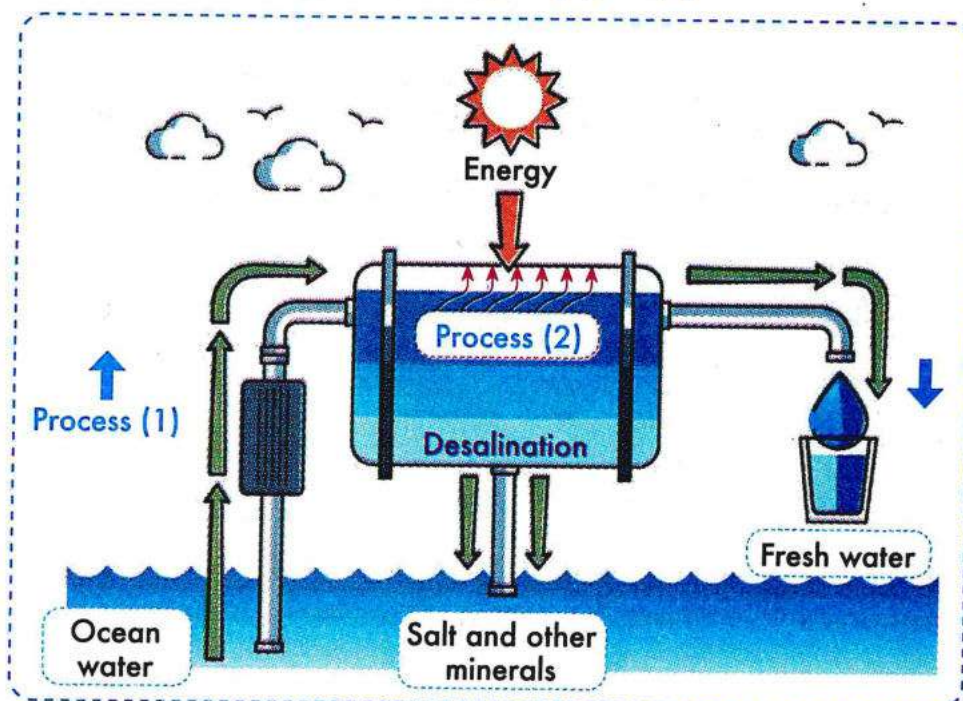
1. The water in oceans is considered a mixture.

2. You can't drink the water of oceans and seas.

(Dakahlia 2023)

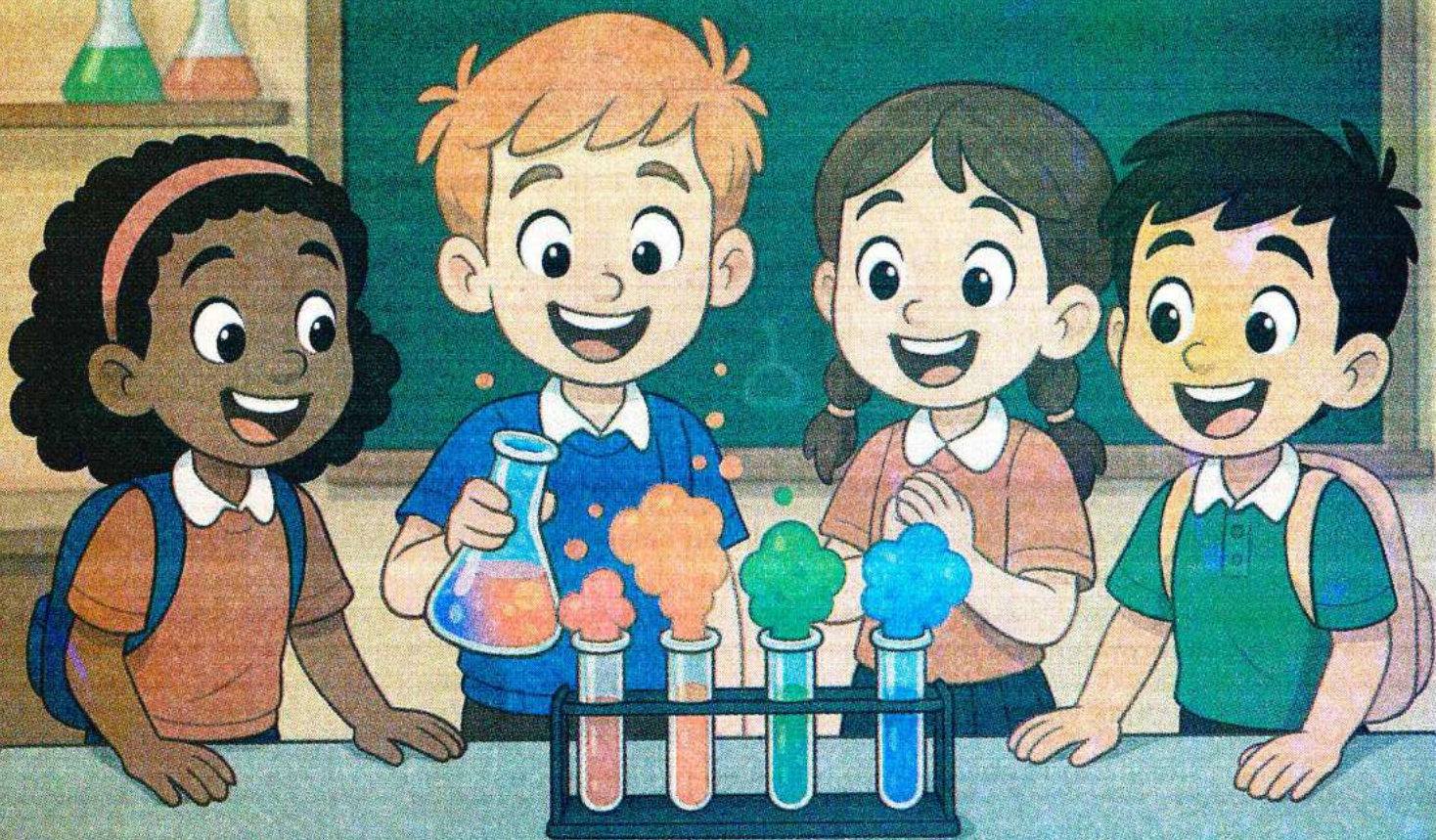
6 What happens when:

- We pump water that contains large amounts of salt back into the oceans after the desalination process?

7 Observe the following diagram, then put (✓) or (x):

1. This diagram shows the desalination process. ()
2. We can drink water after process (1). ()
3. Fish, shells, and seaweed are removed by the process (2). ()
4. Salts and minerals evaporate during process (2). ()
5. The water produced from process (2) is fresh water. ()

Projects

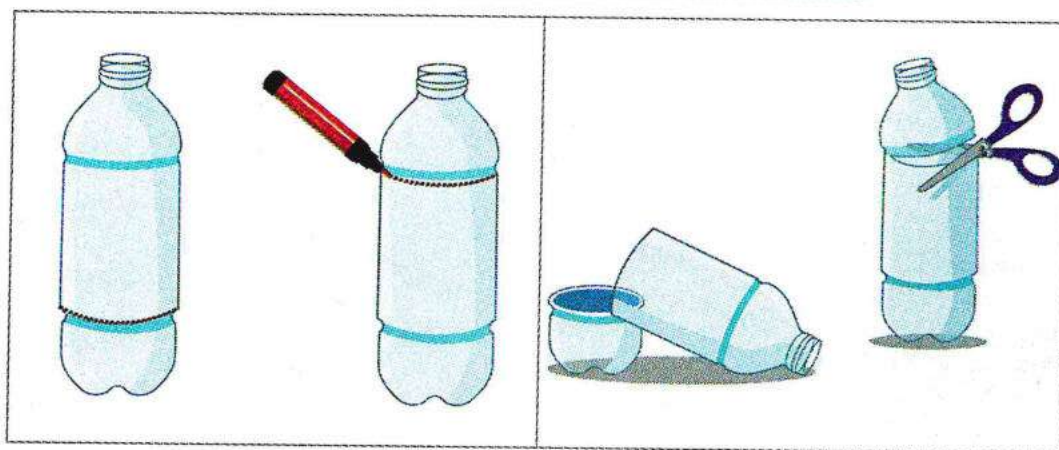


Project of Unit 1**Build a Miniature Ecosystem**

» You will build a miniature ecosystem using recycled plastic bottles.

» **After completing the project, you will discover:**

- The interaction between living organisms and nonliving things.
- The role of each living organism in the ecosystem.

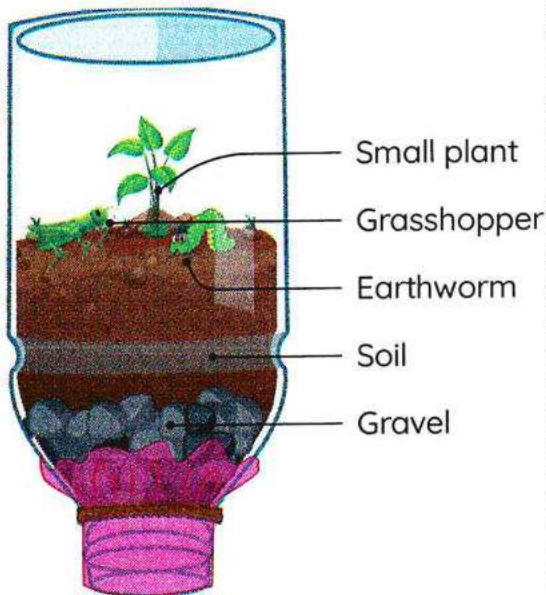
A Building a Miniature Ecosystem**Steps:**

- 1 Bring two empty plastic bottles and clean them with water and soap.
- 2 Cut the two bottles using scissors, as shown in the previous figure.
- 3 Start to build two miniature ecosystems, as follows:

- **Bottle (A):** Represents the ecosystem on the land and it is called the **"Terrarium Ecosystem"**.
- **Bottle (B):** Represents the marine ecosystem and it is called the **"Aquarium Ecosystem"**.

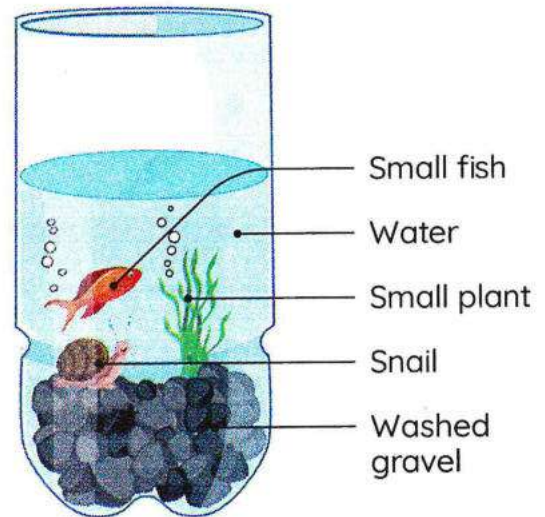
Bottle (A) Terrarium Ecosystem

- Put a layer of **gravel** at the bottom.
- Put a layer of **soil** over the gravel.
- Put a **small plant** in the soil.
- Put a **grasshopper** and an **earthworm**.



Bottle (B) Aquarium Ecosystem

- Put a layer of **washed gravel** at the bottom.
- Pour **distilled water** into the bottle. (Leave an empty space from the top)
- Put a **small plant** in the gravel.
- Put a **very small fish** and a **snail**.



Check your understanding?

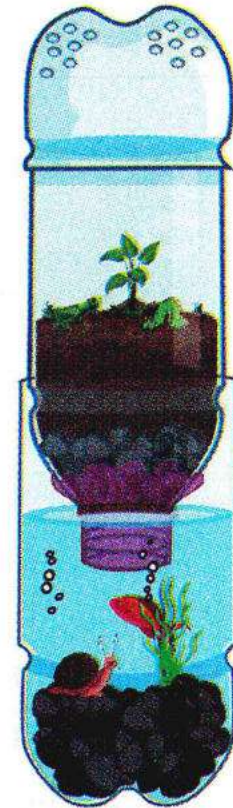
» Observe the two previous figures, and then try to complete the following table:

P.O.C	Nonliving Things	Producers	Consumers	Decomposers
Terrarium Ecosystem				
Aquarium Ecosystem				

B Modeling the flow of energy

Steps:

- 1 Invert the upper part of bottle (A) into the lower part of bottle (B).
- 2 Place the project in a sunny place.
- 3 Close the upper part of the bottle using the cut-off bottom of the bottle.
- 4 Poke small holes in the cut-off bottom of the bottle.
- 5 Observe the project and take your notes after a few days.



Check your understanding?

» Observe the previous figure and try to complete the following food chains for the two bottles;

- Bottle (A): → →
- Bottle (B): → →

Observations:

- » Energy chains for these miniature ecosystems can describe:
 - How energy transfers between living organisms.
 - The role of each living organism.
- » The sun is the main source of energy for all living organisms.
- » Producers make their own food through the photosynthesis process.
- » Consumers depend on other living organisms to get energy.
- » Decomposers recycle the energy in dead things into the ecosystem.

Interdisciplinary project Waste Not, Want Not



How bad is plastic pollution ?

- » People use plastic for everything, such as:
 1. Storing food
 2. Manufacturing medical devices
- » Plastic, as one form of discarded waste, is dangerous to animals.
- » Animals get tangled in plastic rings or suffocated from eating plastic parts.

خطورة التلوث بفعل المواد البلاستيكية:

- يستخدم الناس البلاستيك في كل شيء مثل: 1- تخزين الطعام.
- تعتبر النفايات البلاستيكية خطيرة وبخاصة على الحيوانات.
- يمكن أن تتشابك الحيوانات في حلقات بلاستيكية، ويمكن أن تختنق من ابتلاع أجزاء بلاستيكية.

Plastic in Egypt

- » In the Nile River, scientists have found that over 75% of the fish have swallowed plastic from the pollution caused by humans.
- » Not everything sent to a recycling facility gets recycled because many of these items are contaminated, and therefore cannot be recycled.

مشكلة النفايات البلاستيكية في مصر:

- وجد العلماء أن أكثر من 75 % من الأسماك في نهر النيل تبتلع البلاستيك من التلوث الذي سببه الإنسان.
- للأسف، لا نستطيع إعادة التدوير لكل المخلفات البلاستيكية؛ نظرًا لأن الكثير منها يكون ملوثًا.

Minimizing the Impact

» We cannot give up using plastic, so we must think about how to reduce its impact, for example:

- 1 We can organize volunteer groups on beaches and rivers to collect plastic waste.
- 2 Recycling some of our plastic containers instead of throwing them away.



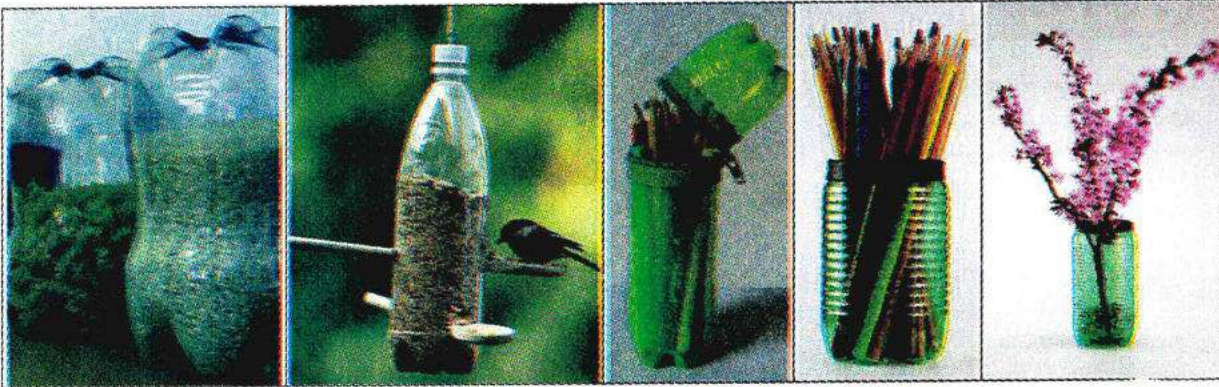
الحد من الآثار السلبية للتلوث بفعل المواد البلاستيكية:

• لا نستطيع الاستغناء عن البلاستيك؛ لذلك يجب التفكير في كيفية تقليل أضراره، فمثلاً:

- يمكننا تنظيم فرق من المتطوعين على الشواطئ والأنهار؛ لجمع المخلفات البلاستيكية.

- نعيد استخدام بعض الحاويات البلاستيكية التي لدينا بدلاً من التخلص منها.

Examples of recycling plastic that can help you:



Project of Unit 2

Slippery Sands

» How did the ancient Egyptians move very heavy, large stone blocks during the building of the pyramids or moving too heavy statues?

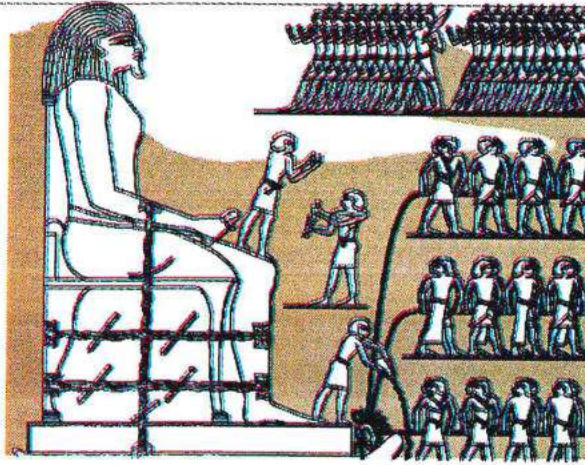
- Scientists and historians discovered the answer in the artworks of ancient Egyptians.

هل تساءلت يوماً: كيف تمكّن المصريون القدماء من تحريك كتل حجرية ضخمة عند بناء الأهرامات أو نقل التماثيل الضخمة؟

• قام العلماء والمؤرخون باكتشاف الحل في اللوحات المصرية القديمة.

Historians

- Historians have looked at the paintings of ancient Egyptians for clues.
- In the painting, a person is seen pouring a liquid in front of the sleds.
- For years, historians believed that this was related to a holy cleansing ceremony.



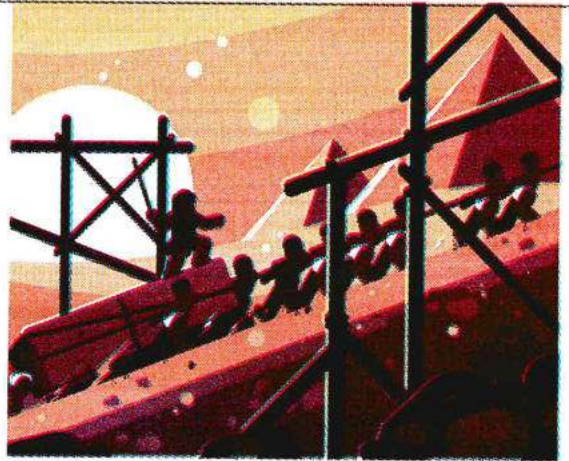
Moving a Large Statue

المؤرخون:

- نظر المؤرخون إلى اللوحات الفنية المصرية القديمة.
- يظهر في الصورة رجل يقوم بسكب سائل ما أمام الزلاجات التي تحمل الصخور.
- اعتقد المؤرخون أن هذا الرجل يقوم بعمل أحد طقوس التطهير للاحتفال بنقل التمثال.

Scientists

- Scientists looked at the paintings in a different way.
- Scientists had a theory that maybe they were adding water to the sand to make it more slippery and decrease the friction force so they could move the statue more easily.



Building the Pyramids

العلماء:

- نظر العلماء إلى اللوحات بطريقة مختلفة.
- يرى العلماء أن المصريين القدماء يضيفون الماء إلى الرمل لجعل الرمل أكثر انزلاقاً ولتقليل الاحتكاك؛ حتى يتمكنوا من تحريك التمثال بسهولة أكثر.



Properties of Sand:

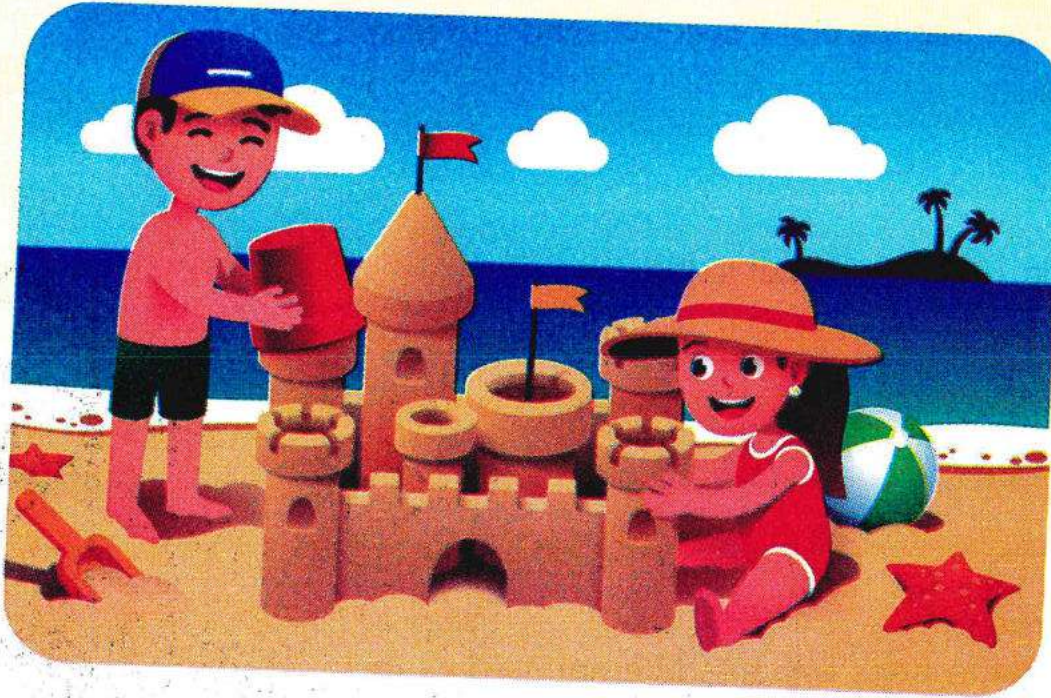
» Why would adding water reduce the friction?

- Sand particles are often rough with strong angles and edges.
- When water is added to the sand, it forms bridges that connect the particles to one another. This is why damp sand sticks together and you can shape and curve it.

خصائص الرمل:

• جزيئات الرمل خشنة ولها زوايا وحواف قوية.

• عندما يضاف الماء إلى الرمل، ترتبط الجسيمات ببعضها أكثر؛ ولهذا فإن الرمال الرطبة تلتصق ببعضها، ويمكنك تشكيلها وتقويسها.



Idea:

» You will investigate how water is used to make sand more slippery to understand how water can affect the properties of sand.

الفكرة:

• سوف تستكشف كيف يجعل الماء الرمال أكثر انزلاقاً؛ لفهم كيف يمكن أن يؤثر الماء على خصائص الرمل.

Materials:

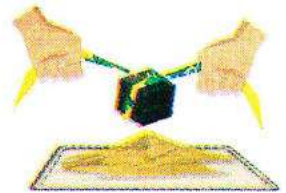
» Sand – Water – String – Measuring cup – Tray – Heavy wooden block

Project Steps:

1 Place the wooden block on the tray over the sand.



2 Tie a thread around the block.



3 Try to drag the block over the sand and record the results.



4 Add 100 mL of water to the sand.



5 Try to pull the block again.



Test:

- » Repeat the steps with the different blocks used.
- » Increase the percentage of water added to the sand.
- » Repeat the steps again and record the results.

Observation and Conclusion:

- » Water makes sand more slippery, which makes it easier for heavy blocks to move over it.



2026

Science

Revision Book

5

**Primary
First Term**

By Ahmed Omara





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Final Revision



Revision on Concept 1.1

Plant Needs

1 Definitions

Photosynthesis

It is the process through which the plant makes its own food inside its leaves by using the light energy from the sun.

Germination

It is a process in which the plant sprouts and begins to grow from a seed.

Plant reproduction

It is the process of making new plants.

Seed dispersal

It is the transportation of the seeds from one place to another.

Basic needs

They are natural resources that living organisms need to survive.

The sun

The main source of energy for all living organisms.

Glucose

It is the food of the plant that provides it with energy to grow and survive.

Flowers

They are the reproductive parts of many plants.

Stomata

They are pores (tiny openings) on the surface of plant's leaves that allow gases to move into and out of the plant.

2 Importance

Roots

- They absorb (draw) water and nutrients from the soil.
- They fix (anchor) the plant in the soil.

Stem

- It transports water and nutrients from the roots to the leaves.
- It supports the leaves and flowers of the plant.

Leaves

They make the plant's food (glucose) through photosynthesis process.

Flowers

They help the plant reproduce by producing seeds.

Xylem

It consists of small tubes that transport water and nutrients from the roots to the leaves.

Phloem

It consists of small tubes that transport glucose from the leaves to all plant parts.

Root hairs

They increase the amount of water and nutrients that the plant takes in from the soil.

Stomata

They allow gases to move into and out of the plant.

Chlorophyll

- It captures (absorbs) the light energy from the sun.
- It gives the leaves their green color.

Plant transport system

It is the system of vessels (tubes) that transport water, nutrients, and the plant's food between the plant's parts.

Human circulatory system

It is the system that transports oxygen and nutrients through blood to all body parts.

Heart

It pumps the blood to all body parts.

Arteries

They carry the blood rich in oxygen and nutrients (glucose) from the heart to all the body cells, so the body survives.

Veins

They return the blood that carries carbon dioxide and a small amount of oxygen and nutrients from the body cells to the heart.

Blood capillaries

They are tiny blood vessels that connect arteries to veins.

3 Give a reason for:

- ① Food is very important for humans and animals.
 - Because food provides them with the energy needed to grow and survive.
- ② Photosynthesis process is important for plants to survive.
 - Because it helps the plant to make its own food.
- ③ Green plants can make its own food.
 - Because they can make photosynthesis process.
- ④ Life on Earth without plants would be impossible.
 - Because plants produce oxygen gas during photosynthesis that is important for animals and humans to breathe.
- ⑤ Sunlight is a basic need for plant to survive.
 - Because plants use sunlight during photosynthesis process to make its own food.
- ⑥ Roots have important role in photosynthesis process of plants.
 - Because they absorb water and nutrients from the soil.
- ⑦ Plants' roots have structures like hairs.
 - Because they increase the amount of water and nutrients absorbed by plants' roots.
- ⑧ Xylem vessels are important for plants.
 - Because they transport water and nutrients from the roots to the leaves.
- ⑨ Phloem vessels are important for plants.
 - Because they transport glucose from the leaves to all plant parts.
- ⑩ Xylem is one-way vessel.
 - Because xylem carry water in one direction from roots to leaves.

- ⑪ The leaves is very important for plant.
 - Because leaves makes the plant's food during photosynthesis.
- ⑫ Chlorophyll has an important role in the photosynthesis process.
 - Because chlorophyll absorbs the energy of sunlight to make the plant's food during the photosynthesis process.
- ⑬ The presence of stomata on the surface of the plant's leaves.
 - To allow gases to move into and out the plant.
- ⑭ Flowers are very important for plants' survival.
 - Because they produce seeds that help the plant to reproduce.
- ⑮ A farmer found seeds that are not from the seeds of his farm.
 - Because seeds are dispersed from one place to another in many ways.
- ⑯ Burdock seeds can stick on animal fur and human cloth.
 - Because their seeds are spiny.
- ⑰ Seeds of dandelion or maple can disperse through the wind.
 - Because their seeds are small and light.
- ⑱ Seeds are dispersed in many ways.
 - Because the way of seed dispersal depends on the size and the shape of seeds.

4 What happens if:

- ① Plants can't get water from the soil?
 - Plants can't make their own food through the photosynthesis process.
- ② Plants can't get carbon dioxide gas from air?
 - Plants can't make their own food through the photosynthesis process.
- ③ We put a seed of bean in wet soil for many days?
 - Seed germinates and grows well.
- ④ A plant is placed in a dark place for few days?
 - Plant's leaves become weak and pale green.
- ⑤ A plant is placed in a dark place for many days?
 - The plant can't make photosynthesis process so it dies.
- ⑥ The plant doesn't have roots?
 - Plants can't absorb water and nutrients from the soil.

⑦ The plant doesn't have stem?

- Water and nutrients can not be carried from the roots to the leaves.

⑧ The leaves of a plant are removed?

- Plant can't make its own food through the photosynthesis process so it can't survive.

⑨ Plants' leaves don't contain chlorophyll?

- Plants' leaves can't absorb the sunlight and can't make the photosynthesis process.

⑩ The stomata on plants' leaves are closed for a long time?

- Gases can't move into or out of the plants' leaves.

⑪ We remove the flowers of a plant?

- Plant can't reproduce and can't produce seeds.

⑫ The plant transport system consists of xylem tubes only?

- The sugar produced in a plant's leaves won't be transported to the other parts of the plant.

⑬ The seeds of the dandelion were heavy?

- Dandelion seeds wouldn't be dispersed by wind.

⑭ There are no spines on burdock seeds?

- Burdock seeds won't stick on animals' fur or humans' clothes, so they won't be dispersed.

5 Comparisons

Xylem	Phloem
It consists of small vessels that transport water and nutrients from roots to leaves .	It consists of small vessels that transport glucose sugar from leaves to other plant parts .

Arteries	Veins	Blood capillaries
They carry the blood rich in oxygen and nutrients from the heart to all the body cells.	They return the blood that carries carbon dioxide and waste from the body cells to the heart.	They connect arteries to veins.

6 Summary

P.O.C	Plants	Humans and Animals
Similarities	• All living organisms need water and air .	
Differences	They are different in: • Structure • Some needs • The way of getting food and gases.	
Basic Needs (To survive)	• Air • Water • Sunlight • Nutrients	• Air • Water • Food • Shelter
Way of Getting Energy	Plants can make their own food (glucose) inside their leaves through the photosynthesis process.	They must eat food because they can't make their own food.
Way of Getting Gases	Gases enter plants through the stomata in the leaves.	Air enters the human body through the mouth and nose , then travels to the lungs .

Some Concepts About Plant's Needs

Sunlight



① A plant placed in the sunlight.

- It grows **strong** and **healthy**.
- It grows with a **tall** stem.
- It has **more dark** green leaves.

② A plant placed in a dark room.



- It grows **weak** and **unhealthy**.
- It grows with a **short** stem.
- It has **less pale** green leaves.

Soil



- Soil is not a basic needs of a plant.
- Plants can grow without soil for a while if they have water and sunlight, but finally they need soil.

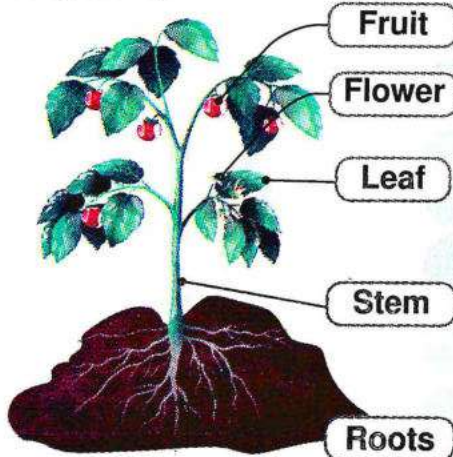
A plant can grow in a **wet paper towel**.

- The initial growth of the seeds in the wet paper towel and soil is **similar**.
- The seeds planted in wet paper towels grow **slower than** those planted in the soil.



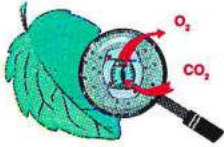
Plant Structure

- All structures inside the plant help it **survive** and **grow**.
- A green plant consists of **roots**, **stem**, **leaves**, and sometimes **fruits** and **flowers**.

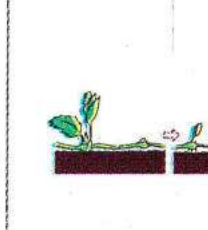


- It helps the plant reproduce by producing seeds.
- It helps in making the plant's food (glucose) through the photosynthesis process.
- It supports the plant parts.
- It carries water and nutrients from the roots to the leaves through the xylem.
- They absorb water and nutrients from the soil.
- They fix (anchor) the plant in the soil.

Other Small Structures Inside the Plant

Root hairs (extend from the roots)		• They increase the amount of water and nutrients absorbed from the soil.
Xylem (inside stem)		• A set of small vessels that transfer water and nutrients from the roots to the leaves .
Phloem (inside stem)		• It transfers food (glucose sugar) from the plant's leaves to other plant's parts .
Chlorophyll (inside the leaf)		• It captures light energy from the sun. • It gives the leaves their green color.
Stomata (inside the leaf)		• They are pores on the plant's leaves that allow air to move into or out of the plant.

Types of Stems

1 Wood Stem	2 Upright Stem	3 Climb Stem	4 Tuber Stem (Extend underground)	5 Runner Stem Extend above ground and helps form new plants.
				
Tree trunks and shrubs	Most flowers	Vine (grapes)	Potato plant	Strawberries

Types of Leaves

1 Narrow Leaves (Look like needles) (Such as pine trees)	2 Flat and Wide Leaves (such as banana leaves)
	

Flowers

- Flowers are the **reproductive parts** of a plant, as they help the plant **reproduce** by **producing seeds**.
- Flowers on plants have different **shapes**, **sizes**, and **colors**.
- Some plants have very small flowers that are hardly seen, such as **grass**.
- Sunflowers** have small, dark-colored seeds in the center of the flower.



Ways of Seed Dispersal

Seed dispersal It is the transportation of the seeds from one place to another.

- The way of seed dispersal depends on the **shape** and the **size** of the seeds.

1 Floating on water surface.

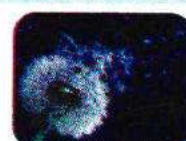


Coconut Seeds

2 Travelling by wind (light seed).



Maple Seeds



Dandelion Seeds

3 Sticking on animals' fur or on human clothing.



Burdock seeds
(have spines).

4 Eaten by animals and come out with their stool.



Tomato Seeds



Apple Seeds

Photosynthesis

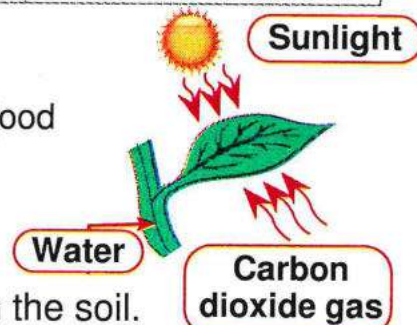
It is the process through which the plant makes its own food inside its leaves by using the light energy from the sun.

Steps:

- The **plant's roots** absorb water and nutrients from the soil.
- The **xylem** transports water and nutrients from the roots to the leaves.
- The **chlorophyll** captures the light energy from the sun.
- The **stomata** allow air to enter the plant's leaf.
- In the presence of sunlight, water combines with carbon dioxide gas to make a type of sugar called **glucose**.
- The **phloem** transports the glucose from the leaves to the other parts of the plant.
- The plant releases **oxygen** and **water vapor** in the air.

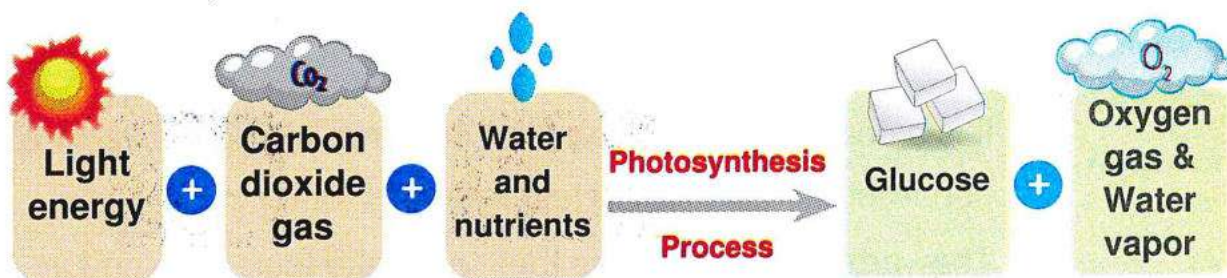
Energy Transformation

- Light energy absorbed from sunlight is converted into chemical energy stored in glucose during the photosynthesis process.



Products of Photosynthesis:

- 1 Glucose as a source of energy for plants.
- 2 Plants release oxygen gas and water vapor into the air.



Comparing Plants and Humans Transport Systems

P.O.C	Humans Circulatory System	Plants Transport System
Drawing		
Structure	1 Heart. 2 Blood vessels. - A Veins. B Arteries. - B Blood capillaries. 3 Blood.	1 Xylem. 2 Phloem.
Similarities	1 They are similar in function. They transport nutrients and gases to all parts of the living organism's body. 2 Both have one-way vessels.	

Revision on Concept 1.2

Energy Flow in Ecosystems

1 Definitions

Ecosystem

It is a community (an area) that contains living organisms and non-living things that interact with each other.

Producers

They are living organisms that can make their own food in the presence of sunlight.

Consumers

They are living organisms that eat other living organisms to get energy because they can't make their own food.

Decomposers

They are living organisms that carry out the decomposition process by breaking down or decaying dead organisms.

Primary consumers

They are animals that eat producers and they are known by Herbivores.

Secondary consumers

They are animals that eat primary consumers.

Tertiary consumers

They are animals that eat secondary consumers.

Predator

It is the animal that hunts (eats) another animal.

Prey

It is the animal that is hunted (eaten) by another animal.

Energy

It transfers between animals in a food web to help them survive.

Food chain

A model that shows a linear set of feeding relationships and the flow of energy among living organisms.

Food web

A model that shows several interconnected food chains among living organisms.

2 Importance

Ecosystem	It provides living organisms with food, water, and shelter.
Glucose	It provides plants with energy to grow and survive.
Decomposers	- They recycle nutrients back into the ecosystem through the decomposition process. - They increase soil fertility that is important for plant growth.

3 Give a reason for:

- ① Animals eat plants or other animals.
 - To get the energy, because they can't make their own food.
- ② Hawks depend on plants to get their energy.
 - Because hawks eat animals that eat plants.
- ③ The sun is very important for all living organisms on Earth.
 - Because the sun is the main source of energy for all living organisms.
- ④ Green plants are considered as producer organisms.
 - Because they can make their own food through the photosynthesis process.
- ⑤ Food is very important for humans.
 - Because food provides the human body with the needed energy to grow, survive and do all vital activities.
- ⑥ Decomposers are very important for an ecosystem.
 - Because they return nutrients of dead organisms back to the soil.
- ⑦ Snakes are considered as consumers.
 - Because they can't make their own food, so they eat other animals to get energy.
- ⑧ Soil fertility depends on decomposers.
 - Because they return nutrients to the ecosystem by decomposing dead organisms' bodies that increase the soil fertility.
- ⑨ Sticky seeds can be dispersed by humans or animals.
 - Because sticky seeds can be dispersed by sticking to humans' clothes or animals fur.

4 What happens if:

- ① A hawk is placed in an ecosystem that contains plants only?
 - The hawk moves to another ecosystem to search for food or it dies.
- ② There is no sunlight reaches the Earth's surface?
 - The plants cannot make their food so they will die.
- ③ All primary consumers disappear from a certain food chain?
 - All secondary consumers will die or move to another ecosystem.
- ④ The decomposers disappear from an ecosystem?
 - Dead organisms will not be decomposed and their nutrients will not return back to the soil.

5 Comparisons

Producers	Consumers	Decomposers
They are living organisms that can make their own food in the presence of sunlight.	They are living organisms that eat other living organisms to get energy.	They are living organisms that breaks down or decaying dead organisms.

Primary Consumers	Secondary Consumers	Tertiary Consumers
They are animals that eat producers.	They are animals that eat primary consumers.	They are animals that eat secondary consumers.

Food chain	Food web
A model that shows a linear set of feeding relationships and the flow of energy among living organisms.	A model that shows several interconnected food chains among living organisms.

6 Summary

Ecosystem It is a community (an area) that contains **living organisms** and **nonliving things** that interact with each other.

Ecosystem Components

Living Organisms	Biotic Factor	• Humans. • Animals. • Plants.
Nonliving Things	A biotic Factor	• Air. • Soil. • Water.

Ecosystem examples:



- Ecosystems provide living organisms with **food** and **shelter** to survive.
- Energy moves between animals when they feed on each other.
- When living organisms die, their bodies decompose.
- Animals don't choose their food, but they eat what their bodies need.

Rabbits eat grass.	Caracals eat mice and rabbits.	Birds eat worms.
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- Hawks are **meat-eating animals**.
- Hawks eat **snakes, mice, fish, birds, squirrels, rabbits,** and other **small ground animals**.
- Hawks don't eat plants, but they eat animals that eat plants. So, they also depend on plants to get their needed energy.
- Hawks are attacked by a few predators, such as **eagles** and **other hawks**.
- When hawks die, **decomposers** return their energy to the soil.



Energy Transfer in Ecosystems

- The sun is the primary (main) source of energy for all living organisms.
- Green plants are producers, while animals and humans are consumers.

1 Producers (The first link in any food chain)

- They are living organisms that can make their own food in the presence of sunlight through photosynthesis process.
- **Example:** Green plants

2 Consumers

- They are living organisms that feed on other organisms to get energy.

a Primary consumers: (The second link in a food chain)

They are living organisms that eat producers.

Examples: insects, mice and rabbits.

b Secondary consumers:

They are living organisms that eat primary consumers.

Examples: birds and frogs.

c Tertiary consumers: (The third link in a food chain)

They are living organisms that eat secondary consumers.

Examples: alligators, lions and sharks.

3 Decomposers (The final link in any food chain)

- They are living organisms that carry out the decomposition process by decaying dead organisms.
- **Importance:**
 - 1 They recycle nutrients back into the ecosystem.
 - 2 They increase the soil's fertility.
- **Examples of decomposers:**

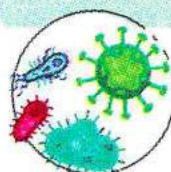
Fungi



Earthworms



Bacteria



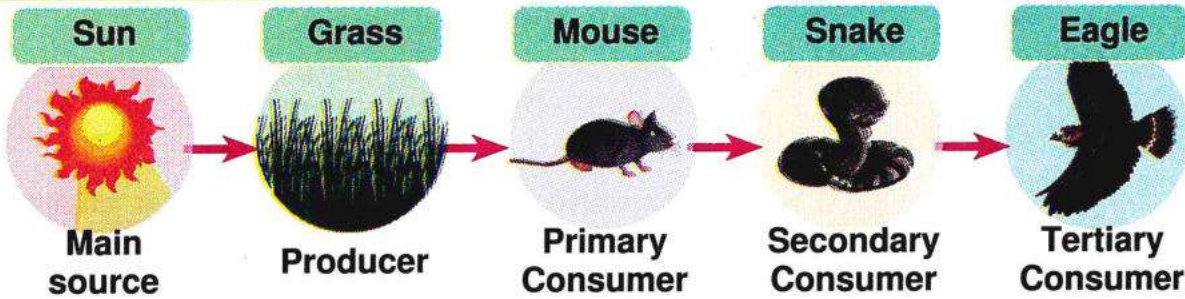
Millipedes



Food Chain

It is a model that shows a linear set of feeding relationships and the flow of energy among living organisms.

Example of a food chain:



- The energy from the **sun** passes to the **grass**, then to the **mouse**, then to the **snake**, then to the **eagle**.

Predator

It's the animal that eats (hunts) another animal.



Prey

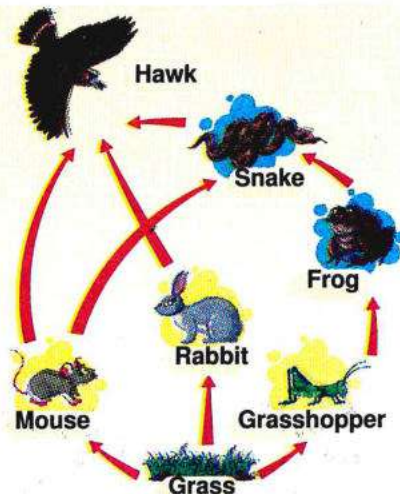
It's the animal that is eaten (hunted) by another animal.



Food web

It is a model that shows several interconnected food chains among living organisms.

- A food web is made up of several interconnected food chains.
- The food web is better than the food chain in showing the interaction among organisms many living organisms that share the same food resources.



Dr. Becky Barak



Job

- **Plant community ecologist**

(It means she studies groups of plants.)

Where does she work?

- She does her researches in **natural areas (prairie)**, where plants and animals exist.

Studies

- She learned about **ecology**.
- She studied **restoration ecology**.

(Restoration ecology means repairing damaged habitats.)

Seed Dispersal

1 Sticky Seeds

Their seeds can stick to

Human clothes

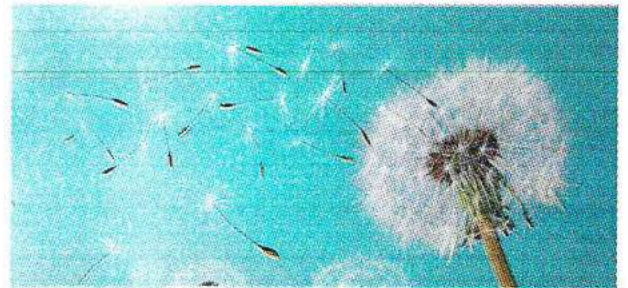


Animals fur



2 Light (Flying) Seeds

They are dispersed by the wind.



Revision on Concept 1.3

Changes in Food Webs

1 Definitions

Top predators	They are consumers that exist at the top of the food chains.
Population	It is the number of organisms of one type of species living in an area.
Population change	It is the increase or decrease in the number of one type of species in an area.
Microorganisms	- They are tiny living organisms that can't be seen by the naked eye. - They are the producers that can only survive in cold water habitat.
Coral reefs	They are the most diverse and valuable marine ecosystems on Earth.
Microplastics	They're small pieces of plastic (smaller than a grain of rice) that are formed due to the effect of the sun.
Habitat restoration	A process of returning a habitat to its natural state before the harm was done.
Nursery	An area in the ocean, where scientists take care of small pieces of coral.
Zero plastics	A way of life adopted in Egypt, in coastal communities near coral reefs by limiting the use of single-use plastic products.

2 Importance

Coral reefs

They provide many marine organisms with food and shelter.

Habitat

- It works on repairing all parts of the habitat.

restoration

- It works on restoring the food and water resources

Nursery

An area in the ocean, where scientists take care of small pieces of coral.

3 Give a reason for:

- ① If the number of one species in an ecosystem increases, they all die.
 - Because the food resources will run out (disappear).
- ② Algae are considered producers.
 - Because algae can make their own food through the photosynthesis process.
- ③ Gentle rain benefits the desert ecosystem.
 - Because rain water helps producers to grow then consumers feed on producers.
- ④ Heavy rain harms the desert ecosystem.
 - Because it causes flooding and death of producers so consumers will move to new ecosystem or die.
- ⑤ Microorganisms are very important in the marine ecosystem.
 - Because they are the source of food for many small fish.
- ⑥ Seabirds build their nests on mountains near a cold water habitat.
 - Because they feed on small fish that feed on microorganisms that live in cold water habitat.
- ⑦ Sharks may move away to another ecosystem due to death of algae.
 - Because sharks feed on many marine organisms that feed on algae.
- ⑧ Plastic is very harmful to marine organisms.
 - Because plastics are sharp and toxic.
- ⑨ Coral bleaching occurs when the water temperature rises.
 - Because coral reefs get rid of algae living in their tissues.

⑩ Habitat loss occurs for many living organisms.

- Due to human activities such as adding buildings and roads, overfishing, and throwing waste in water.

⑪ The restoration process has positive effects on ecosystems.

- Because it prevents species from extinction by restoring shelters and food and water resources.

⑫ The nursery plays an important role in protecting corals from bleaching.

- Because in nursery, scientists take care of small pieces of coral until they grow up.

4 What happens:

① To the food resources if the number of one species increases in an ecosystem?

- The food resources decrease or they may run out.

② To the sharks if all algae disappear from a certain marine food web?

- Sharks will move another ecosystem or die.

③ To the grass amount in a desert that is exposed to drought for a long time?

- Grass dies.

④ To the number of secondary consumers if the number of primary consumers decreases in an ecosystem?

- The number of secondary consumers decreases.

⑤ If the climate change is unsuitable for a population of one type of species?

- The population of this species decreases.

⑥ To microorganisms if the seawater becomes warm?

- Microorganisms move to another cooler water habitat.

⑦ To coral reefs when the seawater temperature rises?

- They get rid of algae living in their tissue, so coral bleaching occurs.

⑧ If a habitat is not restored before damage is done?

- Many species in this habitat may be lost or extinct.

⑨ To a small lake if it is exposed to extreme hot weather?

- The lake may disappear completely due to evaporation of water.

⑩ If people throw big amount of plastic garbage in water?

- The water will be polluted which harm marine organisms.

5 Summary

The energy in an ecosystem remains as it is.

- Some of the energy transfers among living organisms when they feed on each other.
- Most of the energy is recycled back to the ecosystem by **decomposers**.

In any ecosystem:

If producers disappear,

- primary consumers will die quickly.
- secondary consumers will move to another habitat or they will die.

If the number of one species of organisms increases too much,

- the food resources will **run out**.

If there are many top predators in the food web,

- the number of other consumers will decrease.

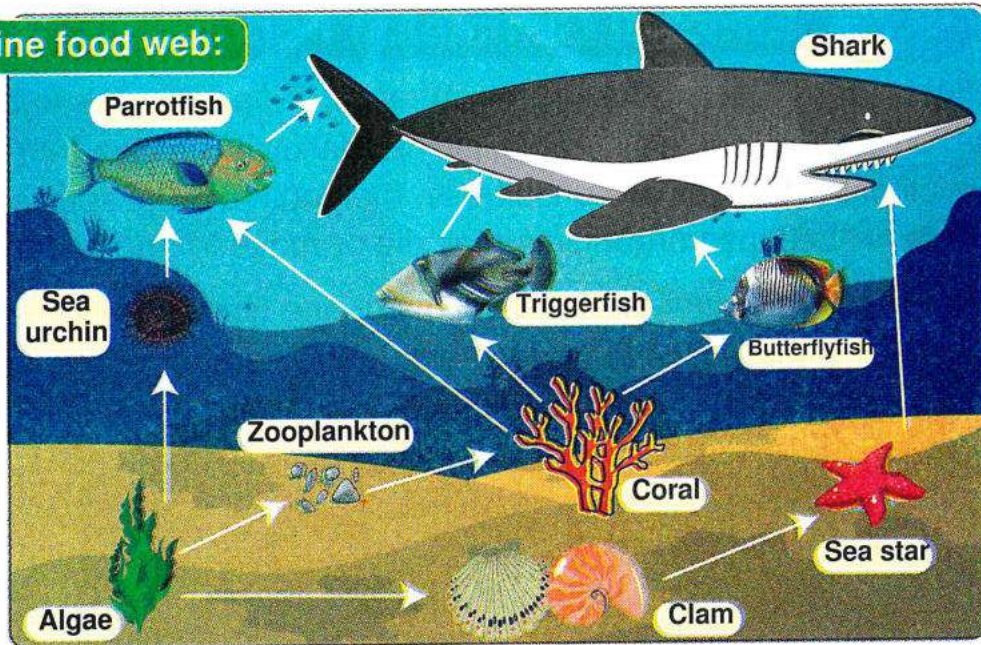
In the desert ecosystem

If there is ..	Result	Reason
Gentle Rain	• The desert ecosystem might be improved.	• Rainwater helps producers grow. • Consumers feed on producers.
Heavy Rain	• The desert ecosystem might be harmed.	• Heavy rain leads to floods, which destroy the ecosystem.
Drought	• The desert ecosystem might collapse.	• Producers die. • Consumers move to another habitat or they die.

In the marine ecosystem

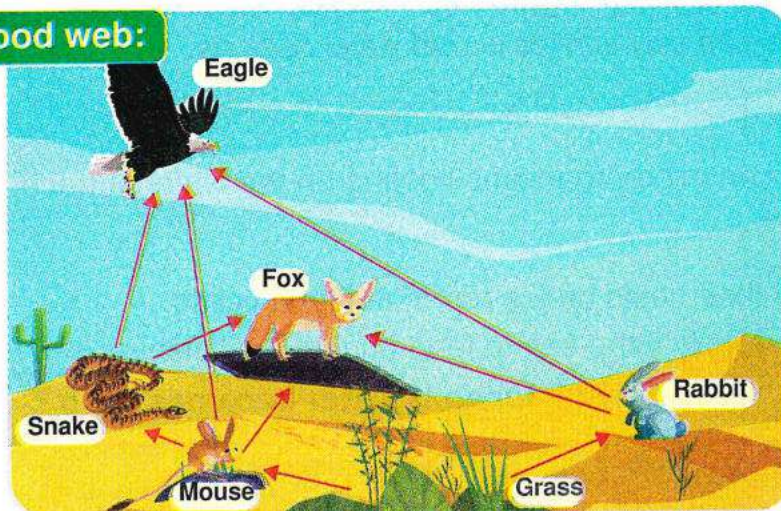
Overfishing	• A human activity that leads to a decrease in the number of fish.
Water Pollution	• A human activity in which humans throw waste materials into the water in rivers, seas, and oceans. • Water pollution: It is the harm that happens to water by substances that harm living organisms.

In the marine food web:



- **Algae** is producers that produces its own food.
- **Zooplankton**, **clams**, and **sea urchins** are primary consumers.
- The **sea star** feeds on the clam and is eaten by sharks.
- The **parrotfish** feeds on sea urchins or corals.
- **Butterflyfish** and **triggerfish** feed on corals.
- The **shark** is a top predator that eats butterflyfish, parrotfish, triggerfish, and sea stars.

In the desert food web:



- **Grass** is the producer that produces their own food.
- **Rabbits** and **mice** are primary consumers that feed on producers.
- **Hawks** and **foxes** are top predators.

Effect of Climate on Population

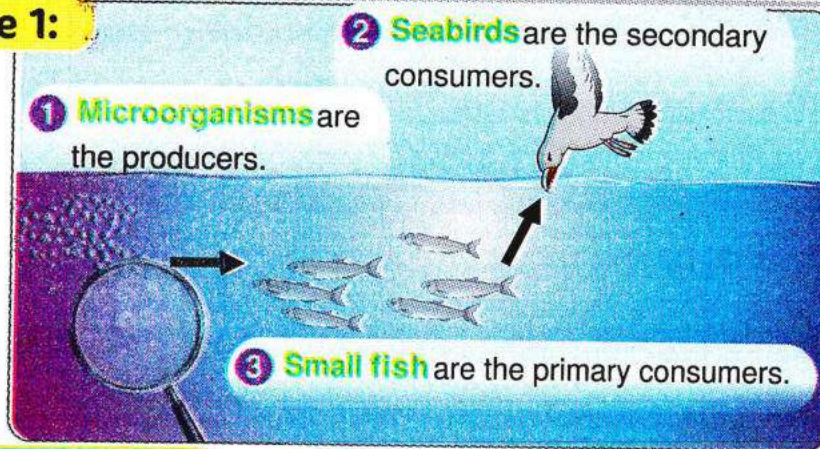
The climate changes affect the population of species, as follows:

- ① If the climate changes are suitable, the population of species **increases**.
- ② If the climate changes are unsuitable, the population of species **decreases** because organisms may die or move to another ecosystem.

Population It is the number of organisms of one type of species in an area.

Population Change It is the increase or decrease in the number of one species in any area.

Example 1:



① Microorganisms

- Microorganisms are the producers because they can make their own food.
- Microorganisms are tiny organisms that cannot be seen by the naked eye.
- Microorganisms can only survive in cold water habitats.

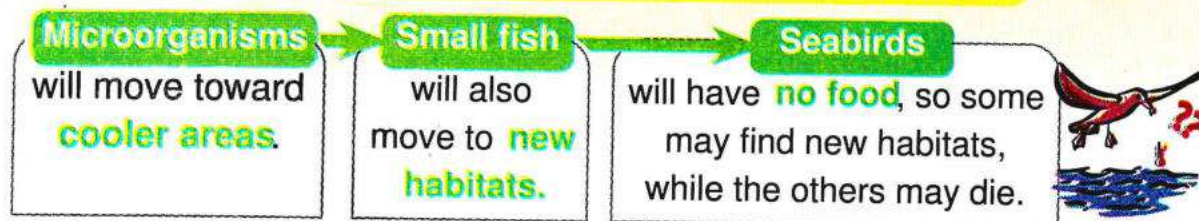
② Small fish

- Small fish feed on microorganisms floating on the water surface.

③ Seabirds

- Seabirds build their nests on the top of mountain cliffs.
- Seabirds dive deeply into the sea to feed on the small fish.

What will happen if water becomes warm?

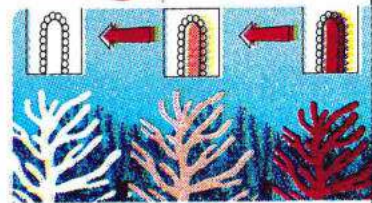


Example 2:

- Coral reefs are from the most diverse and valuable ecosystems on Earth.
- **Importance of coral reefs:**
 - 1 Coral reefs provide **food** and **shelter** for many marine organisms.
 - 2 Coral reefs are also important for tourism.

How does coral bleaching happen ?**When the water becomes too warm:**

- 1 Coral reefs **get rid of the algae** living in their tissues.
- 2 This causes the color of the coral reefs to turn completely **white**.
- 3 Bleaching events stress corals, so they do not survive.

**Effect of Plastic Pollution**

- Plastic is very dangerous because it is **not nutritious** and could be **sharp** or **toxic**.
- Some marine organisms, such as whales, turtles, seabirds, and fish cannot differentiate between real food and a piece of plastic.

Examples:**Turtles**

Turtles eat a lot of plastic, thinking that they are **jellyfish**.

Corals

Corals **filter** the seawater to get their food, so they **ingest** microplastics.

• Microplastics:

- They are small pieces of plastic that are even smaller than a grain of rice.
- They are formed by the effect of **the sun**.

Habitat restoration

It is the process of returning a habitat to its natural state before harm was done.

Example 1:

Coral Reefs Rehabilitation Project in Arabian Gulf

- 1 Scientists harvest small parts of coral species.
- 2 Scientists move them to a "nursery".
- 3 In the nursery, small pieces of corals grow up healthy.
- 4 Scientists return the healthy coral pieces to the reefs where they were dying.
- 5 Healthy corals can continue growing and reproducing to make new coral reefs.



A **nursery** is an area in the sea or ocean where scientists take care of small pieces of coral.

Example 2: Zero plastics

A way adopted by coastal communities in Egypt to decrease plastic pollution by limiting single-use plastic products.

Some ways to reduce plastic pollution:

Using less plastic products.

Stop throwing plastic into the water.

Recycling plastic waste.

People in Palau use conservation programs to protect the marine environment by:

- 1 Controlling the human activities on land by preventing throwing waste materials into the ocean to protect it from pollution.
- 2 Preventing fishers from overfishing in coral reef regions.

Revision on Concept 2.1

Matter in The World Around Us

1 Definitions

Matter	It is anything that has mass and volume (takes up a space).
Volume	It is the amount of space that matter takes up.
Particles	They are the building units of matter.
Model	It is a copy that is similar to a real thing.
Globe	It is a model of the whole Earth in the shape of large ball.
Solar System	It is a very big place that consists of sun and eight planets.

2 Importance

Ruler	It is used to measure the length of some matters such as a length of a book.
Measuring tape (Tape measure)	It is used to measure the length of some matters such as a length of a room.
Balance (scale)	It is used to measure the mass of matter.
Thermometer	It is used to measure the temperature of matter.
Electron microscope	It is used to see one tiny particle, such as one blood cell.
Model	- It is a great way to see many things at the right size. - It helps us understand how things work.

Globe	- It is used to show: 1 The shape of the Earth. 2 How much Earth is covered with oceans. 3 Where different countries are located.
Solar System Model	- It shows us all the planets at once. - It helps us compare between planets according to the size and the location.
Germ model	- A germ model helps us to see: 1 The shape of germs without a microscope. 2 The different parts of germs that help them spread from one person to another.
Model of a volcano	It shows the volcano shape and how ooze liquid comes out during a real eruption.
Model of an airplane	It shows how an airplane flies up in the air.
Ping pong 3D Model	It shows the movement of the particles and the spaces between them.

3 Give a reason for:

- 1 Book is a matter.
 - Because it has mass and volume.
- 2 Wood is a solid matter.
 - Because it has definite shape and volume.
- 3 Oil is a liquid matter.
 - Because it has indefinite shape and definite volume.
- 4 Oxygen is a gas matter.
 - Because it has indefinite shape and volume.

- ⑤ Wood has definite shape and volume.
 - Because it is a solid matter.
- ⑥ Oil has indefinite shape and definite volume.
 - Because it is a liquid matter.
- ⑦ Oxygen has indefinite shape and volume.
 - Because it is a gas matter.
- ⑧ A piece of iron keeps its shape when putting it into different containers.
 - Because iron is a solid matter that has a definite shape.
- ⑨ Liquids take the shape of their containers.
 - Because liquids have indefinite shape, and their particles can slide over each other.
- ⑩ Particles of a piece of iron are very close to each other.
 - Because it is a solid matter.
- ⑪ Particles of water vapor move more freely than those of water.
 - Because particles of water vapor have more spaces between them than particles of water.
- ⑫ Scientists don't use a normal microscope to see tiny particles of matter.
 - Because a normal microscope is not powerful enough.
- ⑬ Sometimes we need to use an electron microscope.
 - To see each tiny particle as it is more powerful than normal microscope.
- ⑭ Using models to study some scientific concepts.
 - To study them in an easier way.
- ⑮ Scientists make model of germs.
 - To show the shape of germ and parts of it without using a microscope.
- ⑯ Using models to study some scientific concepts.
 - To study them in an easier way.
- ⑰ Globe is a useful tool in learning.
 - Because it shows us the shape of Earth, how much it is covered with water and the location of different countries.
- ⑱ Solar system is a useful tool in learning.
 - Because it shows us all planets at once and help us to compare them.

⑱ The arrangement of particles inside a solid state is different than that in a liquid state.

- Because particles of the solid state are organized in a regular pattern, while liquid particles have a random arrangement.

⑲ Chef keeps vegetables in the freezer.

- To keep vegetables fresh and ready to be used for a long period of time.

4 What happens:

① To the shape of ice cube if you put it in an empty cup?

- The shape of ice cube doesn't change.

② To the shape of water if we put water in a container?

- Water takes the shape of each container.

③ To the state of water after it is heated in the kettle for few minutes?

- The state of water changes from liquid state into gas state.

④ To the volume of a coin if we move it from a cup to another cup?

- The volume of a coin doesn't change.

⑤ To the volume of water if we put it in new container?

- The volume of water doesn't change.

⑥ To the speed of particles of an ice cube when it is exposed to the sun?

- The particles move faster and spread from each other.

⑦ To the size of a balloon when you blow it up?

- It increases.

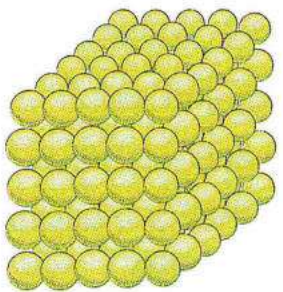
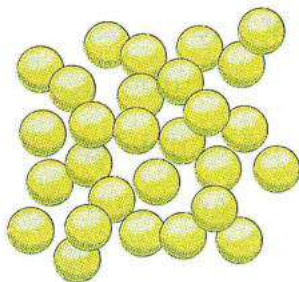
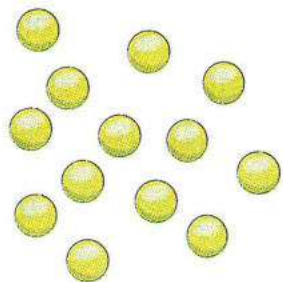
⑧ To the arrangement of particles of water after freezing?

- It is organized.

⑨ To the state of water if we put small amount of it in the freezer for few hours?

- It changes from liquid state to solid state.

5 Comparisons

P.O.C	Solid	Liquid	Gas
Figures			
Shape	Definite. (Fixed.)	Indefinite. (Variable.)	Indefinite. (Variable.)
Volume	Definite. (Fixed.)	Definite. (Fixed.)	Indefinite. (Variable.)
Arrangement of particles	Organized. (Regular pattern.)	Not well organized. (Random arrangement.)	Not organized at all. (Random arrangement.)
Forces between particles	They are held together.	They are held together more loosely.	They are not held together.
Spaces Between Particles	They are very close to each other. (Packed tightly.)	They have more spaces.	They have a lot of spaces.
Energy of Particles	They have less energy.	They have more energy.	They have a lot of energy.
Motion of Particles	They move only a little bit.	They move more freely.	They move very freely.

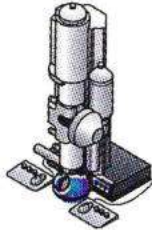
6 Summary

Matter

- **Matter** is anything that has **mass** and **volume** (takes up space).
- Matter can exist in **three** states: **solid**, **liquid**, and **gas**.
- All matters are made up of tiny, identical moving **particles**.
- **Light**, **sound**, and **heat** are not matters, but they are forms of **energy**.

Measuring Tools

Tape Measure	Balance (Scale)	Measuring Cup
		
It is used to measure length .	It is used to measure mass .	It is used to measure volume .

Thermometer	Electron Microscope
	
It is used to measure temperature .	It is used to see individual particles of matter.

States of Matter

P.O.C	Solids 	Liquids 	Gases 
Shape	• Definite (fixed). • Keep their shape.	• Indefinite shape. • Take the shape of the container. • Can be poured.	• Indefinite shape. • Fill their container and take its shape.
Volume	• Definite (fixed).	• Definite (fixed).	• Indefinite.
Spaces between particles	• Very close. • Are held together (packed tightly).	• Have more spaces. • Are held together more loosely.	• Have a lot of spaces. • Are not held together.
Energy of particles	• Less energy.	• More energy.	• A lot of energy.
Motion of particles	• Move only a little bit. (Move around their place.) (Vibrate.)	• Move more freely. • Move faster than solids. • Can slide over each other.	• Move very freely. • Move very quickly.
Arrangement of particles	• Regular (organized). • Packed in a neat, ordered arrangement.	• Have random arrangements. • Are not well organized.	• Have random arrangements. • Are not well organized at all.

Model

It is a copy that is similar to the real thing.

Importance of models:

1 Models are a great way to see many things at the **right size (not the real size)**.

Models represent very big things in a smaller size, such as:	Models represent very tiny things in a bigger size, such as:
Globe model  • It shows us the Earth shape, locations of countries, and the amount of water covering it.	Germs model  • To see the shapes of germs. • To see different parts that help germs spread from one person to another.
The Solar system model  • To compare between planets.	

2 Models can help us understand how things work.

• Volcano model

It shows us shape of volcano and how ooze liquid comes out during a real eruption.

Revision on Concept 2.2

Describing and Measuring Matter

1 Definitions

Physical properties	They are properties of matter that are observed by our five senses or measured using a specific tool without changing the structure of matter.
Chemical properties	They are properties that describe matter according to its ability to change into new matter that has different properties.
Volume	It is the amount of space that matter takes up.
Mass	It is a measurement of the amount of matter.
Temperature	It is a physical property that measures how quickly the particles in a substance are moving.
Conduction	It is the ability of a material to transfer heat and conduct electricity.

2 Importance

Stones	They are used to build the roof of a desert home.
Ceramic tiles (Bricks)	They are used to build the roof of a cold weather home.
Leaves and sticks	They are used to build the roof of a tropical rainforest home.
Ruler	It is used to measure length of some matters such as a length of a book.
Measuring tape (Tape measure)	It is used to measure length of some matters such as a length of a room.

Balance (scale)	It is used to measure the mass of matter.
Thermometer	It is used to measure the temperature of matter.
Measuring cup	It is used to measure the volume of matter.
Hand lens	It is used to examine the shape of crystals of sugar, salt and flour.
Helium gas	It is used to fill balloons and blimps.
Copper	- It is used in making electrical wires. - It is used in making the body of cooking pans.
Plastic (Wood)	- It is used in covering electrical wires. - It is used in making the handles of cooking pans.
Glass	It is used in making windows, eyeglasses and light bulb.
Steel	It is used in making screwdrivers and hammers.
Rubber	It is used in making athletic shoes, gloves and tires.

3 Give a reason for:

- The material of roof of houses vary from one environment to another.
 - Because roof materials depend on the climate where the home is built.
- The roof of a desert home is made of strong stones.
 - To protect home from dust and dirt.
- The roof of a tropical rainforest home is made of leaves and sticks.
 - To prevent animals from getting inside it.
- The roof of a cold weather home is made of ceramic bricks (tiles).
 - To protect home from snow and rain.
- The roof of a cold weather home is slanted (inclined).
 - To allow snow to slide over it.
- You can't differentiate between sugar and salt by your sense of sight.
 - Because both have white color.

Final Revision

- ⑦ The ability of iron to rust is considered a chemical change.
 - Because when iron interacts with air, it forms rust (new substance).
- ⑧ The ability of paper to burn is considered a chemical change.
 - Because when paper interacts with fire, it forms ash (new substance).
- ⑨ A wooden cube floats on the water surface.
 - Because the density of wood is less than the density of water.
- ⑩ An iron cube sinks in water.
 - Because the density of iron is more than the density of water.
- ⑪ You can separate a mixture of sand and iron nails by using a magnet.
 - Because iron nails are attracted to magnets, while sand isn't attracted to magnets.
- ⑫ Balloons and blimps, filled with helium gas, rise up in the air.
 - Because helium gas is lighter than air.
- ⑬ Humans can use helium gas safely.
 - Because helium gas is not flammable or poisonous.
- ⑭ Copper is used in making electrical wires.
 - Because copper is a good conductor of electricity and can be stretched into thin, flexible wires.
- ⑮ Copper is used in making the body of cooking pans.
 - Because copper is a good conductor of heat.
- ⑯ Plastic or wood is used in making the handles of cooking pans.
 - Because both of them are a bad conductor of heat.
- ⑰ Steel is used in making screwdrivers and hammers.
 - Because steel is hard and strong.
- ⑱ Glass is used in making windows.
 - Because glass is transparent.

4 What happens:

- ① If the roof of a desert home is made of sticks and leaves?
 - It can't protect it from dirt and dust.

- ② If the roof of a cold climate home is flat?
 - The rain is collected on the top of the roof.
- ③ If you burn a piece of paper?
 - Paper interacts with fire forming ash.
- ④ If the particles of matter move faster? (According to the matter temperature)
 - Matter temperature increases.
- ⑤ To iron nails if they are left in the air for a long time?
 - Iron nail rusts.
- ⑥ If you put a wooden cube and an iron nail in a container of water?
 - The wooden cube floats on the water surface, while the iron nail sinks in water.
- ⑦ If you approach a magnet to some paper clips?
 - Paper clips are attracted to the magnet.
- ⑧ To Blimps, if they are filled with helium gas?
 - Blimps rise up in the air.
- ⑨ You touch the handles of cooking pots that are made of copper?
 - Your hand will be burned because copper is a good conductor of heat.

5 Comparisons

P.O.C	Desert Home	Cold Weather Home	Tropical Rainforest Home
Roof Material	Strong stones.	Ceramic tiles. (Bricks)	Leaves and sticks.
Roof Shape	Flat.	Inclined (Slanted).	Inclined (Slanted).
Reason	– To protect the home from dust and dirt. – To reflect the heat coming from the sun.	– To allow snow or rains to slide over it.	– To prevent animals from getting inside the home.

P.O.C	Sugar	Salt	Flour
Size of Crystals	Large crystals.	Small crystals.	Fine particles.

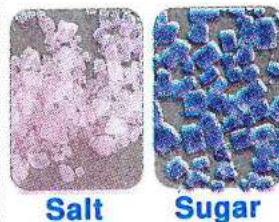
P.O.C	Wooden Cube	Iron Nail	Cork	Stone
Attracted to the Magnet or Not	Not attracted.	Attracted.	Not attracted.	Not attracted.
Sink or Float	Floats.	Sinks.	Floats.	Sinks.

P.O.C	Steel	Glass	Rubber
Properties	• Hard (strong).	• Transparent. • Smooth.	• Waterproof. • Flexible.
Uses	• Screwdrivers. • Hammers.	• Eyeglasses. • Windows. • Electric lamp.	• Tires. • Athletic shoes. • Gloves.

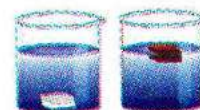
P.O.C	Volume	Mass
Definition	It is the amount of space that matter takes up.	It is a measurement of the amount of matter.
Measuring Units	1 Liters (L). 2 Milliliters (mL). 3 Cubic centimeters (cm³).	1 Kilograms (kg). 2 Grams (g).
Measuring Tools	Measuring cup.	Balance (scale).

6 Summary

- Salt, sugar, and flour have the same color.
- They have different textures, odors, and shapes.
 - a Sugar has **large** crystals.
 - b Salt has **small** crystals.
 - c Flour has **fine** particles.



- Some substances **float** on the water such as **wood** and **cork**.
- Some substances **sink** in the water such as **iron** and **stone**.



- A magnet attracts some metals such as **iron**.



- Temperature measures how quickly the particles in a substance are moving.
- Quickly moving particles produce more heat energy than slow-moving particles.

Volume and Mass

Volume

It is the amount of space that the matter takes up.

Measuring tool

Measuring cup.

Measuring units

Liters – Milliliters – Cubic centimeters (cm^3).
(1 L = 1,000 mL = 1,000 cm^3)

Mass

It is a measurement of the amount of matter.

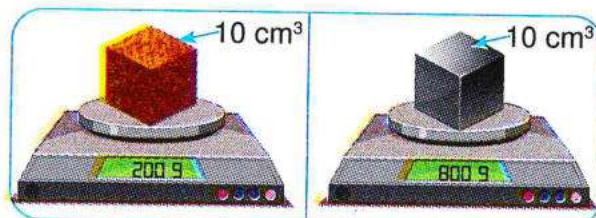
Balance (Scale).

Grams – Kilograms
(1 kg = 1,000 g).

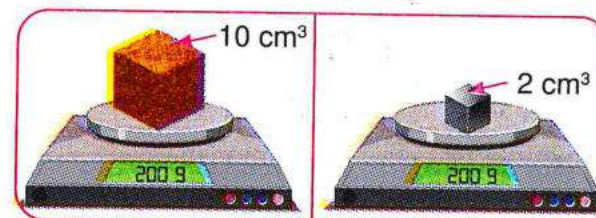
- A paperclip has a mass of about **1 gram**.
- A big bottle of **1 liter** of water has a mass of 1 kilogram.



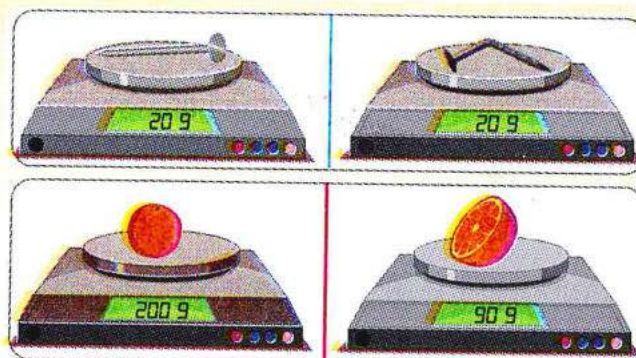
- » Equal volumes of different substances have different masses.



- » Equal masses of different substances have different volumes.



- Changing the **shape** of a material **doesn't affect** its mass.
- Changing the **size** of a material **affects** its mass.



Roofs

- Roof materials depend on the **climate** where the home is located.

	Desert Home	Cold-Weather Home	Rainforest Home
Figure			
Shape	Flat.	Slanted (inclined).	Slanted (inclined).
Material	Strong stones.	Ceramic tiles (bricks).	Leaves and sticks.
To Protect It From	Dust and dirt.	Rain and snow.	Animals.

Uses of Different Matter

Helium	Properties	Uses
	• Lighter than air. • Not poisonous. • Not flammable.	• To fill balloons. • To fill blimps.
Copper	Properties	Uses
	• Flexible (can be stretched). • Good conductor of electricity and heat.	• Electrical wires. • Cooking pots.
Glass	Properties	Uses
	• Transparent. • Smooth.	• Eyeglasses. • Windows. • Electric lamp.
Steel	Properties	Uses
	• Hard. • Strong.	• Screwdrivers. • Hammers.
Rubber	Properties	Uses
	• Waterproof. • Flexible.	• Tires. • Athletic shoes. • Gloves.

Revision on Concept 2.3

Comparing Changes in Matter

1 Definitions

Melting	A process in which matter changes from a solid state to a liquid state by heating.
Freezing	A process in which matter changes from a liquid state to a solid state by cooling.
Evaporation	A process in which matter changes from a liquid state to a gas state by heating.
Condensation	A process in which matter changes from gas state to liquid state by cooling.
Mixture	It is a form of matter made of two or more substances that do not combine chemically.
Compound	It is a form of matter made of two or more substances that combine chemically.
Physical change	They are changes in the size, shape, or even state of the matter without forming a new substance.
Chemical change	It is a change in the matter and its structure, producing new matter.
Desalination	It is a process of removing salt from water.



2 Importance

Thermal energy	It is used in warming houses and cooking food.
Filtration	It is used to separate solid material that doesn't dissolve in a liquid.
Evaporation	It is used to separate solid material that dissolves in a liquid.
Desalination	It removes salt from water.

3 Give a reason for:

- ① **A chocolate bar melts when putting it in a warm place.**
 - Because the particles chocolate absorb thermal energy, causing them to move faster and spread out, so they change into a liquid state.
- ② **When the temperature of ice cubes increases, they melt.**
 - Because ice particles gain thermal energy causing them to move faster and separate from each other and ice turns into liquid water.
- ③ **Although water vapor is invisible, we can see steam during cooking.**
 - Because the water vapor, produced when water boils, condenses when it touches cooler air, forming a white cloud of tiny water drops.
- ④ **Both melting and freezing processes are considered a physical change.**
 - Because the state of matter changes without any change in its structure.
- ⑤ **Formation of water drops on the lid of a pot containing boiling water.**
 - Due to condensation of water vapor when it touches the cooler lid and it turns from gas state to liquid state.
- ⑥ **Salty water is considered a mixture.**
 - Because its components aren't combined chemically together.
- ⑦ **The atmosphere is considered a mixture.**
 - Because it consists of different gases that are not combined chemically together.
- ⑧ **The components of a mixture can be easily separated.**
 - Because the components of a mixture don't combine chemically together.

- ⑨ Filtration is used to separate sand from water.
 - Because filtration process is used to separate solid material that doesn't dissolve in a liquid.
- ⑩ The color of iodine changes on adding it to starch.
 - Because a new substance is formed with dark blue color.
- ⑪ Making fruit salad is considered as physical change.
 - Because the size of fruits changes without any change in their structure.
- ⑫ Rust formed on an iron nail is an example of a chemical change.
 - Because a new matter called iron oxide is formed due to a reaction between iron, oxygen, and water.
- ⑬ Inflating of a balloon containing baking soda on putting it on a bottle containing an amount of vinegar.
 - Because a gas is produced.
- ⑭ The water of oceans is considered as a mixture.
 - Because it consists of water, salts, minerals, gases, dead organisms, and other living— organisms.
- ⑮ You can't drink the water of oceans and seas.
 - Because drinking salt water makes human dehydrates (loses water quickly).
- ⑯ Desalination process may harm marine organisms.
 - Because small marine organisms may be sucked with water into desalination plants.
 - Because the water that contains large amounts of salt is pumped back into the sea.

4 What happens:

- ① To the particles when solid matter is heated?
 - Its particles move faster and spread out.
- ② To the mass of ice when it melts?
 - The mass doesn't change.
- ③ If you put a cup of water in the freezer?
 - Water changes from liquid state into solid state (ice).
- ④ If the temperature of an amount of liquid increases above its boiling point?
 - Liquid state changes into gas state.

- ⑤ If water vapor touches a cold surface?
 - Water vapor condenses and changes from gas state to liquid state.
- ⑥ If water's temperature is decreased below 0°C ?
 - Water changes from liquid state into solid state.
- ⑦ If water's temperature is heated above 100°C ?
 - Water changes from liquid state into gas state.
- ⑧ If salty water is heated for a long time?
 - Water evaporates leaving the salt in the beaker.
- ⑨ If you add some iodine drops to cornstarch?
 - A new dark blue colored compound is formed.
- ⑩ If you add some baking soda to vinegar?
 - Gas bubbles are formed.
- ⑪ If a bottle of milk is left out the fridge for a few days?
 - A bad smell is produced.
- ⑫ If oxygen combines with carbon and hydrogen?
 - A heat is released that starts a fire.
- ⑬ If salty water is heated for a long time?
 - Water evaporates leaving the salt in the beaker.

5 Comparisons

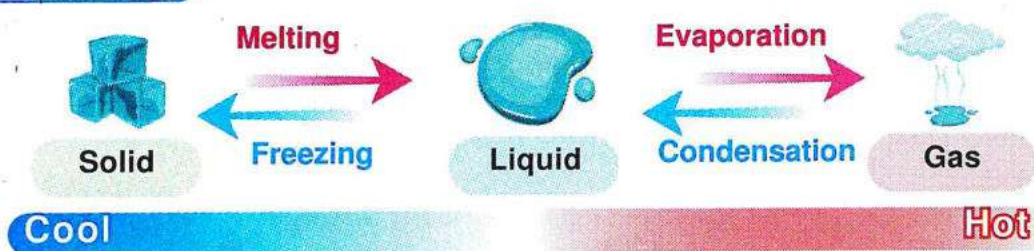
Melting	Freezing	Evaporation	Condensation
A process in which matter changes from a solid state to a liquid state by heating.	A process in which matter changes from a liquid state to a solid state by cooling.	A process in which matter changes from a liquid state to a gas state by heating.	A process in which matter changes from gas state to liquid state by cooling.

P.O.C	Mixture	Compound
Definition	It is a form of matter made of two or more substances that do not combine chemically.	It is a form of matter made of two or more substances that combine chemically.
Examples	Salty water - Salad	Water - Carbon dioxide

P.O.C	Evaporation	Filtration
Way of separation	It is used to separate solid material that dissolves in a liquid.	It is used to separate solid material that doesn't dissolve in a liquid.

P.O.C	Physical Change	Chemical Change
Definition	It is a change in the size, shape, or state of the matter without forming a new substance.	It is a change in the matter and its structure, producing new matter.
Result	No new substance is formed.	A new substance is formed.
Reversed or not	It is reversed.	It isn't reversed easily.
Examples	- Cutting fruit to make salad. - Bending clothes. - Shaping gold. - Melting wax.	- Burning of paper to form ash. - Iron rusting. - Making bread. - Digestion of food. - Rotting fruits.

6 Summary

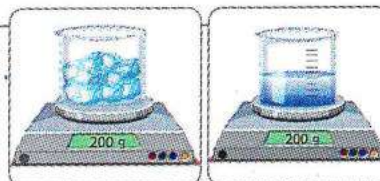


Melting	Freezing	Evaporation	Condensation
Changing matter from a solid state to a liquid state by heating .	Changing matter from a liquid state to a solid state by cooling .	Changing matter from a liquid state to a gas state by heating .	Changing matter from a gas state to a liquid state by cooling .

- **Melting** is the opposite (reverse) process of **freezing**.
- **Evaporation** is the opposite (reverse) process of **condensation**.
- **0°C** is the melting point of water.
- **100°C** is the boiling point of water.
- Water is still liquid between **0°C** and **100°C**.
- When water is cooled below 0°C, the water turns into ice.
- When water is heated above 100°C, water turns into steam.

Changing temperature

- Temperature is a measurement of **how quickly particles** in a substance are moving.
 - **When the temperature of matter increases**, particles move **faster** and get **far from** each other.
 - **When the temperature of matter decreases**, particles move **slower** and get **closer to** each other.
- Changing the temperature affects the **state** of the matter, but it doesn't affect its **mass**.





Heat (Thermal Energy)

- It is a form of energy you use every day for warming houses, cooking food, ...etc.



When the particles of matter absorb light or thermal energy:



The speed of the particles **increases**.

The kinetic energy **increases**.

Matter becomes **warmer**.

Physical Change – Chemical Change

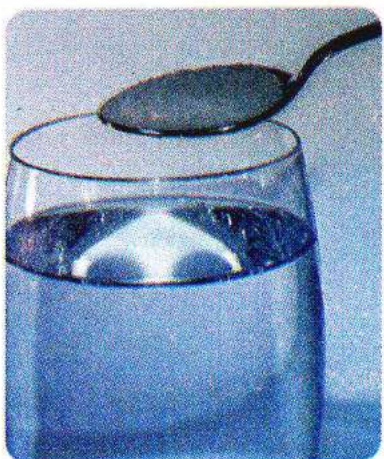
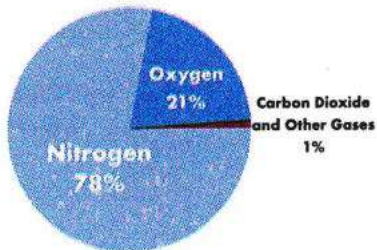
P.O.C	Physical Change	Chemical Change
Properties	- It is a change in the shape, size, or state of matter without changing its structure. (No new substance is formed.) - It can be reversed easily.	- It is a change in the structure of matter to form new matter. (New substance with new properties is formed.) - It can't be reversed.
Examples	- Melting of (wax – ice). - Freezing. - Evaporation. - Condensation. - Cutting of (paper – fruit – cloth). - Grinding sugar into powder. - Bending (shaping) matter.	- Burning of (paper – wood). - Iron rust. - Making bread. - Digestion of food. - Rotting fruits. - Vinegar + baking soda → gas bubbles - Iodine + starch → dark blue substance
	  	  
	  	  

Mixtures and Compounds

- A mixture is different from a compound.
- The mass of each mixture equals the total mass of its components.

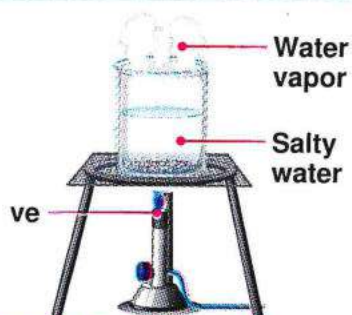
Mixture	Compound
A form of matter made up of two or more substances that don't combine chemically .	A form of matter made up of two or more substances that combine chemically .
Examples	
• Salad. • Atmosphere. • Salty water.	• Carbon dioxide gas. • Water.

A mixture may consist of:

Solid Substances	Solid and Liquid Substances	Gaseous Substances
		
1 Mixture of nuts. 2 Mixture of sand and rocks. 3 Salad.	1 Mixture of salt and water. 2 Mixture of sugar and water.	• Atmosphere (air).

Separation of Mixtures

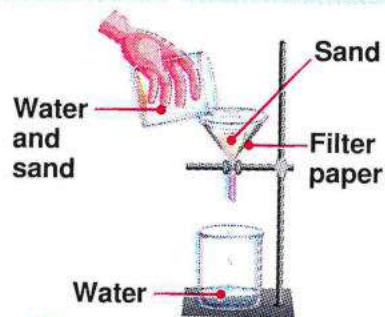
Evaporation



It's used to separate:

Solid material that dissolves in a liquid by **heating**.

Filtration



It's used to separate:

Solid material that doesn't dissolve in a liquid by using a **filter paper**.

Example

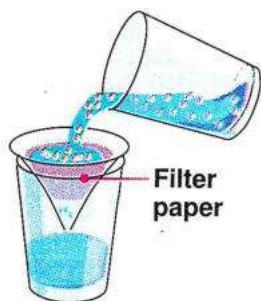
Separation of salt from salty water mixture.

Separation of sand from a mixture of sand and water.

Desalination

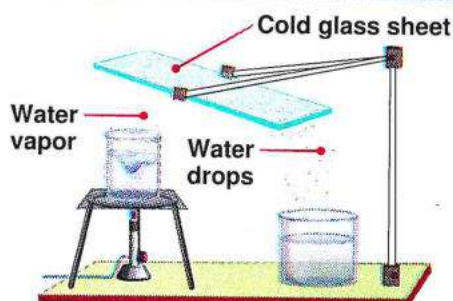
It is the process of **removing** salts from water.

First step: Filtration



Filtration removes any large materials, such as pieces of **seaweed**, **shells**, and **fish**.

Second step: Evaporation

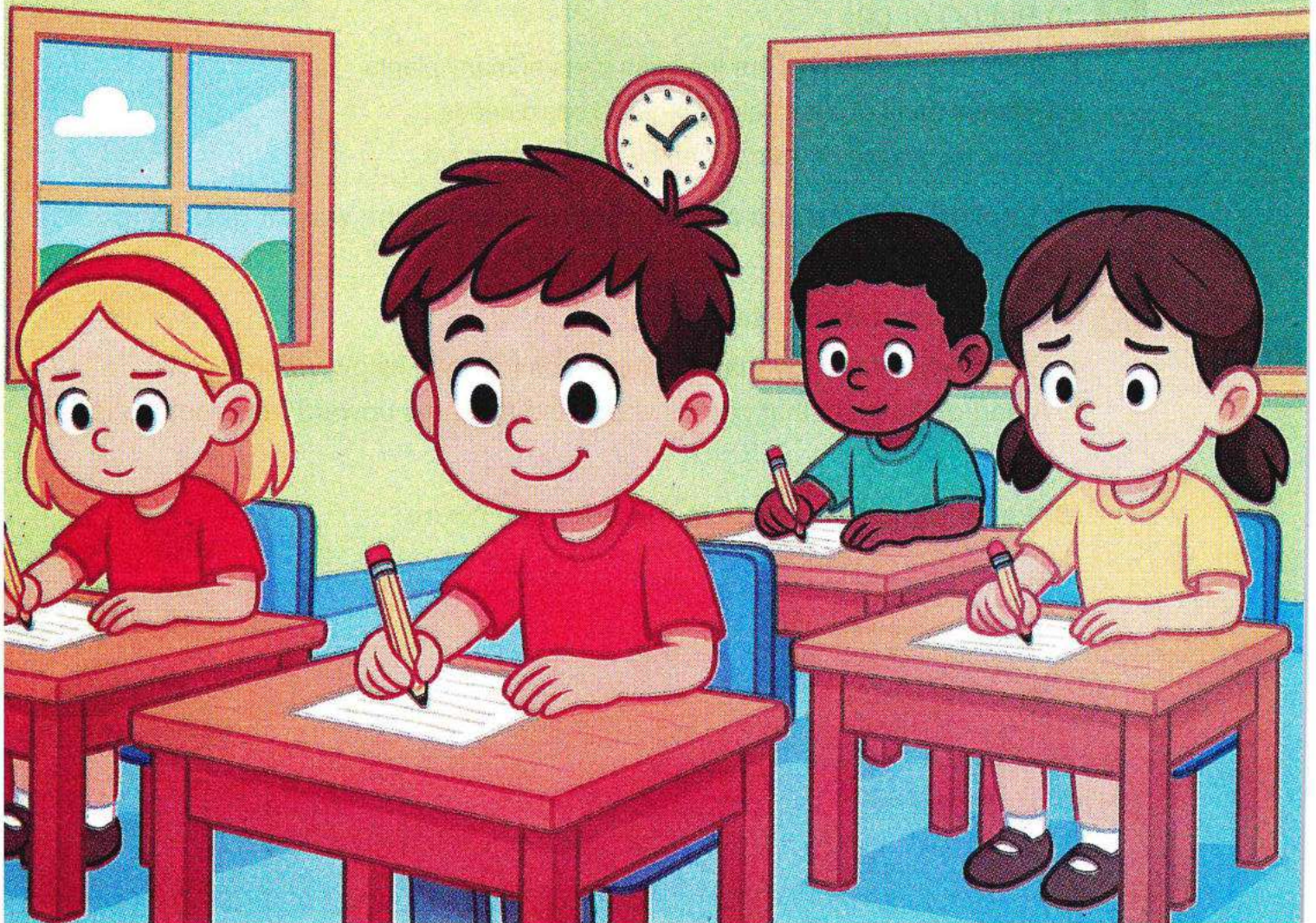


- When boiling filtered water, water vapor rises up leaving salts and other minerals.
- By cooling the rising water vapor, it **condenses** and turns into liquid water that is **safe to drink**.

Disadvantages of desalination:

- 1 It is very expensive.
- 2 It requires a lot of energy.
- 3 It has bad effects on the marine organisms.

Assessments and Model exams



1 (A) Choose the correct answer:

- Plants can make their food by a process known as
 (a) respiration (b) absorption (c) digestion (d) photosynthesis
- Green plant takes from air to make its own food.
 (a) water (b) oxygen (c) sunlight (d) carbon dioxide
- All living organisms need to survive.
 (a) shelter (b) moonlight (c) water (d) carbon dioxide

(B) Give a reason for:

- Roots are very important for plant.

- Food is very important for animals to survive.

2 (A) Put (✓) or (X):

- Roots, soil, and leaves are the main parts of many plants. ()
- Different parts of plant help it to get its basic needs. ()
- Soil is the source of water taken by plants to survive. ()

(B) Explain, "Plants and animals are different in the way of getting food".

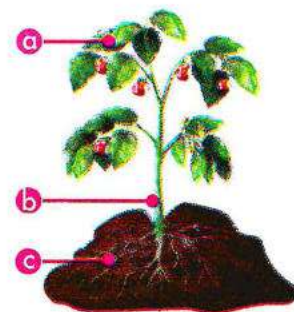
.....

3 (A) Write the scientific term:

- The source of energy that a plant needs to make its own food. (.....)
- A part of the plant that carries water and nutrients upward from roots to leaves.
 (.....)

(B) Label the plants' parts in the opposite figure:

-
-
-



Concept 1.1

Lesson 2

Self-Assessment 2

15

1 (A) Write the scientific term:

1. A process in which the plant sprouts and begins to grow from a seed.
(.....)
2. A gas produced from the photosynthesis process and helps us breathe.
(.....)
3. Parts of plant responsible for making the plant's food.
(.....)

(B) Cross out the odd word:

1. Roots – Stem – Soil – Leaves
(.....)
2. Sunlight – Air – Soil – Water
(.....)

2 (A) Correct the underlined words:

1. Sunlight is not important for plants in their initial growth.
(.....)
2. Water provides the plant with the needed energy to grow.
(.....)
3. The initial growth rate of a seed placed in a soil is slower than that placed in a wet paper towel.
(.....)

(B) What happens if:

1. We put a seed of bean in a wet soil for many days?
.....
2. A plant is placed in a dark place for few days?
.....

3 (A) Complete the following diagram:

• Nutrients + (1) + (2) gas $\xrightarrow{\text{Sunlight}}$ (3) gas + glucose

(B) Mention the importance of each of the following:

1. Plant's stem.
.....
2. Plant's roots.
.....

Concept 1.1

Lesson 3

Self-Assessment 3

15

1 (A) Complete the following sentences:

1. A stem extends underground, while a stem extends along the ground.
2. Pine has stem and leaves look like needles.

(B) Cross out the odd word:

- Carbon dioxide gas – Glucose – Oxygen gas – Fats (.....)

2 (A) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. Stem	Ⓐ give(s) the plants' leaves their green color.
2. Stomata	Ⓑ support(s) plant's leaves and flowers.
3. Chlorophyll	Ⓒ increase(s) the amount of water absorbed from the soil.
4. Root hairs	Ⓓ allow(s) gases to move into and out of the plant.

1. 2. 3. 4.

(B) Give a reason for:

- Life on Earth without plants would be impossible.

3 (A) Complete the following table:

P.O.C	 (1)	Phloem
Transported material(s)	Water and nutrients	 (2)
Direction of transported material(s)	From roots to (3)	From leaves to other plant parts.

(B) Look at the following figures, then complete:

1. The plant in figure (1) has a/an stem.
2. The plant in figure (2) has a/an stem.



Figure (1)



Figure (2)

Concept 1.1

Lesson 4

Self-Assessment 4

15

1 (A) Choose from column (A) what suits it in columns (B) and (C):

Column (A)	Column (B) Carry (carries)	Column (C) from
1. Xylem	Ⓐ plant's food	Ⓐ body cells to heart.
2. Arteries	Ⓑ carbon dioxide gas	Ⓑ leaves to all plant parts.
3. Phloem	Ⓒ water and nutrients	Ⓒ heart to body cells.
4. Veins	Ⓓ oxygen gas and nutrients	Ⓓ plant's roots to leaves.

1. → 2. → 3. → 4. →

(B) Complete the following sentence:

- is the process of producing new plants.

2 (A) Correct the underlined words:

1. Inside plant's leaves, light energy is converted into thermal energy.

(.....)

2. The heart consists of two arteries and two ventricles.

(.....)

3. Glucose is a type of protein produced by plants leaves.

(.....)

4. Air enters human's body through lungs and mouth.

(.....)

(B) What happens if:

- We remove the flowers of a plant?

3 (A) Write the scientific term:

1. They are the reproductive parts of many plants.

(.....)

2. They are tiny blood vessels that connect arteries to veins.

(.....)

3. A human body system that transports gases and nutrients through blood to all body parts.

(.....)

(B) Mention the importance of each of the following:

1. Heart.

.....

2. Stomata.

.....

1 (A) Look at the opposite figures, then complete the following sentences:

1. The seeds in figure can be dispersed by coming out with the animal's stool.
2. The seeds in figure can be dispersed by sticking to the animal's fur.
3. Both seeds are different in their and

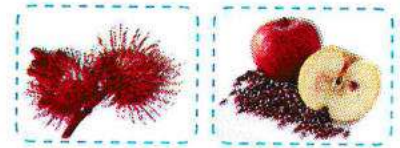


Figure (1)

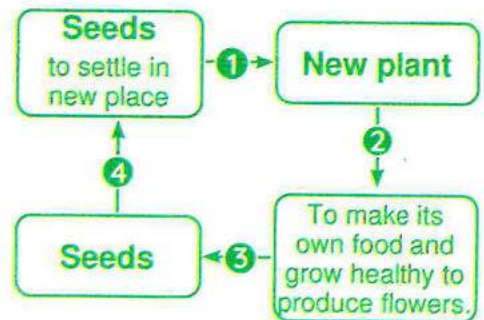
Figure (2)

(B) Give a reason for:

1. Dandelion seeds can be dispersed by wind.
.....
2. Burdock seeds can stick to human's clothes.
.....

2 (A) Look at the following figures, then write the number that represents each of the following process:

1. Seed dispersal process. (.....)
2. Photosynthesis process. (.....)
3. Seed germination. (.....)
4. Reproduction process. (.....)



(B) Cross out the odd word:

- Floating on water – Dispersed by sunlight – Dispersed by wind – Sticking to animals' fur
(.....)

3 Mention an example for each of the following:

1. Seeds can float on water.
2. A flower contains dark-colored seeds in its center.
3. A plant has narrow leaves.
4. A plant has a climb stem.
5. A gas necessary for respiration.

Concept 1.2

Lesson 1

Self-Assessment 6

15

1 (A) Choose the correct answer:

1. A hawk could be a prey for
(a) a rat (b) an eagle (c) a squirrel (d) a rabbit
2. belong(s) to the biotic factors in an ecosystem.
(a) Water (b) Oxygen (c) Soil (d) Insects
3. The energy we get from food originally comes from
(a) water (b) the sun (c) space (d) sugar

(B) Give a reason for:

1. An ecosystem helps living organisms survive.
.....
2. Hawk depends on plants to get energy.
.....

2 (A) Cross out the odd word:

1. Tundra – Desert – Space – Ocean (.....)
2. Eagle – Hawk – Rabbit – Caracal (.....)

(B) Complete the following sentences:

1. When an animal dies, its body, and its energy is returned to the
2. There is a/an between the components of an ecosystem.

3 (A) Look at the opposite figures, then Put (✓) or (X):

1. Animal in figure (1) eats plants to get energy. ()
2. Animal in figure (2) is a meat-eating animal. ()
3. Plant in figures (2) is a non-living thing. ()



Figure (1)



Figure (2)

(B) What happens to:

- A lion lives in an ecosystem that contains plants only?
.....

Concept 1.2

Lesson 2

Self-Assessment 7

15

1 (A) From the given food chain: $X \rightarrow Y \rightarrow Z \rightarrow W$, complete the following:

1. Letter (.....) is a secondary consumer.
2. Letter (.....) can make its own food.
3. Letter (.....) is a herbivore.

(B) Give a reason for:

1. Decomposers play an important role in the ecosystem.
.....
2. Humans are considered consumers.
.....

2 (A) Cross out the odd word:

1. Mouse – Snake – Grass – Hawk (.....)
2. Millipedes – Worms – Locusts – Fungi (.....)

(B) Complete the following sentences:

1. The animal that is eaten by another animal is called a
2. The last link in any food chain is occupied by
3. In the ecosystem, is transferred from one organism to another.

3 (A) Form a food chain by using the following organisms:

1. Mouse – Bacteria – Snake – Grass – Hawk
.....
2. Eagle – Earthworm – Carrot – Snake – Rabbit
.....

(B) Write the scientific term:

1. The primary source of energy for all living organisms on Earth. (.....)
2. A model that shows a linear feeding relationships and energy flow between living organisms in an ecosystem. (.....)
3. The type of sugar provides the plant with energy to grow and survive. (.....)

Concept 1.2

Lesson 3

Self-Assessment 8

15

1 (A) Choose the correct answer:

1. Which organism is absent in the following food chain?



- (a) Consumer. (b) Producer. (c) Herbivore. (d) Decomposer.
2. Which of the following describes the prey-predator relationship?
- (a) Hawk and grass. (b) Caracal and mouse.
(c) Frog and rock. (d) Grass and rabbit.
3. Without _____, Earth would be full of dead bodies.
- (a) consumers (b) producers (c) herbivores (d) decomposers

(B) Give a reason for:

1. Food web is better than food chains to describe the energy flow in an ecosystem.

2. The sun is very important for the life continuity on Earth.

2 (A) Put (✓) or (X):

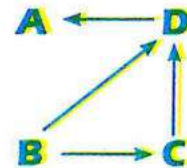
1. A bear can only be a part of only one food chain in its whole life. ()
2. When an animal dies, the energy in its body disappears. ()

(B) Complete the following sentences:

1. The waste of worms and millipedes is rich in _____ that increase the soil _____.
2. Insects, such as butterflies, are considered _____.

3 (A) Study the following food web, then complete sentences below:

1. Letter (.....) refers to a producer organism.
2. Letter (.....) refers to a top predator.
3. Letter (.....) refers to an insect.
4. Letter (.....) refers to an organisms that can be a prey and a predator at the same time.



(B) Correct the underlined word:

- A worm that eats dead leaves is called a producer. (.....)

Concept 1.2

Lesson 4

Self-Assessment 9

15

1 (A) Correct the underlined words:

1. Dr. Becky Barak studies groups of rocks. (.....)
2. Dr. Barak prefers to do her researches in laboratories. (.....)
3. Wind plays a role in the dispersal of sticky seeds. (.....)

(B) Write the scientific term:

1. A network of many interconnected food chains. (.....)
2. A process of rebuilding the habitats that have been damaged. (.....)

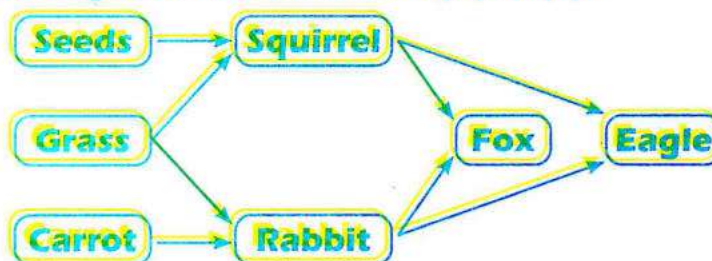
2 (A) Cross out the odd word:

1. Animal fur – Human clothes – Sunlight – Wind (.....)
2. Chicken – Goats – Ducks – Seeds (.....)
3. Maple seeds – Burdock seeds – Apple seeds – Tomato seeds (.....)

(B) Complete the following sentences:

1. The arrows in a food chain or food web show the flow of
2. An animal that is hunted by other animals is called

3 Study the following food web, then Put (✓) or (X):



1. Eagle is the only top predator in this food web. ()
2. Rabbit is a predator for a carrot. ()
3. If the number of rabbits increases too much, carrots will disappear from this food web. ()
4. Energy can flow directly from grass to fox. ()
5. If all grass disappeared, the squirrel would still have another food source. ()

Concept 1.3

Lesson 1

Self-Assessment 10

15

- 1 (A) Complete the following table that describes the effect of rain on a desert ecosystem:

Gentle rain	Heavy rain
..... the ecosystem because	 the ecosystem because

- (B) Form a food chain by using the following organisms:

1. Zooplankton – Shark – Algae – Triggerfish – Coral

- 2 (A) Correct the underlined words:

1. A food chain in a desert environment begins with algae. (.....)
2. Clam is a consumer that feed on corals. (.....)
3. The water of the lake is evaporated due to extreme cold climate. (.....)

- (B) What happens if:

1. All producers disappear from an ecosystem?

2. The number of one species of consumers increases too much?

- 3 (A) Mention one example for each of the following:

1. A human activity that harms a marine ecosystem.

2. A conservation program used by people in Palau to protect its marine environment.

3. A top predator in a desert food web.

- (B) Give a reason for:

1. Algae are considered as producers.

2. Throwing plastic garbage in water harms a marine ecosystem.

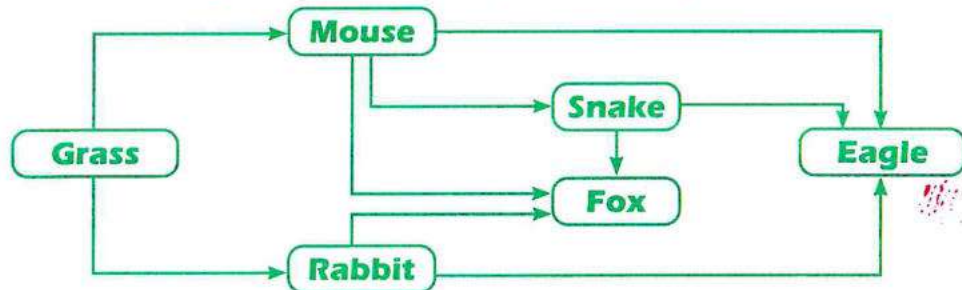
Concept 1.3

Lesson 2

Self-Assessment 11

15

1 Study the following desert food web, then complete the sentences below:



1. and eagle are considered as top predators.
2. The is a prey for the eagle, and a predator for the
3. If all the disappeared, both mouse and rabbit would die quickly.
4. Eagle is a tertiary consumer when it feeds on the

2 (A) Complete the following sentences:

1. If the climate change is suitable, the population of a species
2. water is the suitable habitat for microorganisms to survive.
3. build their nests on the top of mountain cliffs.

(B) Form a food chain by using the following organisms and mention the type of each organism:

Bacteria – small fish – Microorganisms – Seabirds

3 (A) Write the scientific term:

1. They are consumers that exist at the top of the food chains. (.....)
2. Living organisms that recycle energy back into the ecosystem by decaying dead organisms. (.....)
3. They are the main source of food for many seabirds. (.....)

(B) Put (✓) or (X):

1. In the food chain, energy transfers from the predator to the prey. ()
2. The food resources of seabird increases when the water becomes warmer. ()

Concept 1.3

Lesson 3

Self-Assessment 12

15

1 (A) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. Jellyfish	Ⓐ are the producers in a marine food web.
2. Corals	Ⓑ are valuable ecosystems.
3. Coral reefs	Ⓒ are consumers eaten by sea turtles.
4. Microorganisms	Ⓓ are consumers that feed on zooplankton.

1. 2. 3. 4.

(B) Give a reason for:

- Plastic is very harmful to marine organisms.

2 (A) Complete the following sentences:

1. Corals microplastics when they seawater.
2. Plastic get broken down by the effect of into smaller pieces.
3. is the number of organisms of one type of species in an area.

(B) What happens to:

- Coral reefs if the temperature of seawater rises?

3 (A) Correct the underline words:

1. Habitat loss causes survival of many living organisms. (.....)
2. Coral bleaching has positive impacts on marine food webs. (.....)
3. Adding buildings and roads causes habitat restoration. (.....)

(B) Mention one example for each of the following:

1. A way to reduce plastic pollution of seawater.
2. A bird gets harmed by eating plastic.

Concept 1.3

Lesson 4

Self-Assessment 13

15

1 (A) Classify these activities in the table below:

(Eroding river banks – Zero plastic – Coral reef rehabilitation – Adding buildings)

Activities that cause Habitat restoration	Activities that cause Habitat Loss

(B) Write the scientific term:

- An area in the ocean where scientists take care of small pieces of coral until they grow up. (.....)

2 (A) Put (✓) or (x):

1. Restoration projects take a lot of work and a long period of time. ()
2. Applying restoration projects is better than keeping habitats healthy. ()
3. Removing plants from riverbanks causes floods to be more dangerous. ()
4. Zero plastic project aims to prevent coral bleaching in Arabian Gulf. ()

(B) What happens to:

- Population of animals if a habitat is not restored?
.....

3 Arrange the following steps included to rebuild coral reefs:

- () a. Small pieces of coral are grown up healthy.
- () b. Small pieces of unhealthy corals are collected by scientists.
- () c. Healthy corals are returned by scientists to their habitat.
- () d. Healthy coral are reproduced to make new coral reefs.
- () e. Unhealthy corals are moved by scientists to a nursery.

Concept 2.1

Lesson 1

Self Assessment 14

15

1 (A) Classify the following matters in the table below according to their state:

(Gold – Nitrogen – Coal – Oil – Carbon dioxide – Tea)

Solid state	Liquid state	Gas state
.....		

(B) Give a reason for:

- Ice is a matter.

2 (A) Correct the underlined words:

1. Mass is the amount of space occupied by a matter. (.....)
2. Steam released from a hot cup of tea is an example of a liquid state. (.....)
3. Matter is found in four different states. (.....)

(B) Cross out the odd word:

1. Gasoline – Vinegar – Oxygen – Milk (.....)
2. Sugar – Juice – Sand – Wood (.....)

3 (A) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. Glass and air	Ⓐ are different matters found in the same state.
2. Water and steam	Ⓑ are different matters found in different states.
3. Ice and plastic	Ⓒ are the same matter found in different states.

1. 2. 3.

(B) Complete the below sentences using these words: (mass – color – volume)

1. Both the balloon and the tennis ball have the same
2. The tennis ball has a bigger than that of the balloon.
3. The tennis ball has a smaller than that of the balloon.



Concept 2.1

Lesson 2

Self Assessment 15

15

1 (A) Choose the correct answer:

1. Particles of are very close to each other.
(a) steam (b) oil (c) iron (d) oxygen
2. Oil takes the of its container.
(a) volume (b) shape (c) color (d) mass
3. Particles of vinegar move faster than the particles of
(a) wood (b) steam (c) oxygen (d) air

(B) Give a reason for:

1. Water is a liquid matter.
.....
2. Oxygen has no definite shape and volume.
.....

2 (A) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. Thermometer	(a) is used to measure the length of a room.
2. Balance	(b) is used to measure the length of a book.
3. Ruler	(c) is used to measure the mass of vegetables.
4. Measuring tape	(d) is used to measure the temperature of milk.

1. 2. 3. 4.

(B) Cross out the odd word:

- Oil – Iron – Light – Air (.....)

3 (A) Complete the following sentences:

1. Matter consists of tiny moving
2. Vinegar has definite and indefinite
3. The particles of a matter are tightly packed together.

(B) Choose the correct answer:

- Gases have (no volume – fixed volume – indefinite volume)

Concept 2.1

Lesson 3

Self Assessment 16

15

1 (A) Write the scientific term:

- The building units of matter. (.....)
- A device that is used to see the components of one blood cell. (.....)
- A state of matter whose particles are not held together. (.....)

(B) What happens to:

- The size of a balloon filled with air when you squeeze it?
.....
- Speed of water particles, when it changes into ice?
.....

2 (A) Arrange the following words (Ice – Water vapor – Water) according to:

- Speed of particles (in ascending order).
.....
- Spaces between particles (in descending order).
.....

(B) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. Ice	Ⓐ has a variable shape and volume.
2. Water	Ⓑ has a fixed shape and volume.
3. Water vapor	Ⓒ has a definite shape and an indefinite volume.
	Ⓓ has an indefinite shape and a definite volume.

1. 2. 3.

3 Look at the following figures, and then complete the sentences below:

- Figure (...) represents the particles of oil.
- Figure (...) represents the particles of gold.
- Particles in figure (...) can slide over each other.
- Particles in figure (...) spread out to fill up a container they are put in.
- Particles in figure (...) vibrate around their places.



Figure (1)



Figure (2)



Figure (3)

Concept 2.1

Lesson

4&5

Self Assessment 17

15

1 (A) Correct the underlined words:

1. The particles of wood have a random arrangement. (.....)
2. Oil take the volume of their container. (.....)
3. The smell of food coming from a kitchen is a liquid matter. (.....)
4. A model is a great way to see things in the real size. (.....)

(B) Give a reason for:

- A chef freezes some vegetables in freezer.

2 (A) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. Globe	(a) shows us how it flies in the air.
2. Germ model	(b) shows us how much Earth is covered by water.
3. Solar system model	(c) represents very tiny things in a larger size
4. An airplane model	(d) helps us to see all the planets at once.

1. 2. 3. 4.

(B) What happens if:

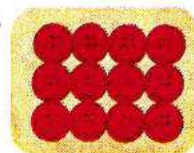
- We put a cup of water in the freezer? (According to the speed of particles)

3 (A) Complete the following sentences:

1. The components of the vegetable salad are solids that have shape.
2. Solar system consists of and eight
3. is a copy that is similar to a real thing that we can't see with our eyes.

(B) Look at the following figure then complete:

1. This figure represents the particles of a state of matter.
2. If we want to make a model for liquid state, we must the distance between buttons.



Concept 2.2

Lesson 1

Self Assessment 18

15

1 Look at the following figures, and then complete the following sentences:



Home (1)



Home (2)



Home (3)

1. Home (1) has a/an roof.
2. Both home (2) and home (3) have a/an roof.
3. The roof of home (3) prevents from getting inside.
4. Snow would be collected on the roof of home (2) if it was

2 (A) Write the scientific term:

1. A property of matter that can be measured by a measuring cup. (.....)
2. A material that is used to build the roof of cold weather homes. (.....)
3. A tool that is used to measure the height of a table. (.....)

(B) Mention one importance for each of the following:

1. Balance.
2. Thermometer.

3 (A) Complete the following sentences using words between brackets:

(climate – suitable usage – specific tools – our senses)

1. Roof materials depend on the where the home is located.
2. Properties of matter can be measured by using
3. Properties of matter can be described using
4. The properties of matter helps us know its

(B) Give a reason for:

- The roof of a desert home is made up of strong stones.

Concept 2.2

Lesson

2&3

Self Assessment 19

15

1 (A) Classify the following properties into physical and chemical properties:



a Paper burns and form ash.



b Feather is smooth.



c Salt has a white color.



d Rusting of an iron nail.

(B) What happens to:

- An Iron nail and a stone if we put them close to the magnet?

2 (A) Write the scientific term:

1. It is the amount of space that matter takes up. (.....)
2. It is a measurement of the amount of matter. (.....)
3. A physical property that measures how quickly the particles in a substance are moving. (.....)

(B) Complete the following sentences:

1. Three kilograms = grams.
2. Half liter = mL.

3 (A) Correct the underlined words:

1. Changing the shape of matter affects on its mass. (.....)
2. Floating or sinking of any object in water depends on its mass. (.....)
3. The sense of smell helps us determine the texture of sugar. (.....)

(B) Cross out the odd word:

1. Milliliter – Liter – Gram – Cm^3 (.....)
2. Iron nail – Plastic spoon – Rock – Wooden cube (.....)

Concept 2.2

Lesson 4

Self Assessment 20

15

1 (A) Mention the material used in making the following products:



(B) Write the scientific term:

- The ability of a material to transfer heat and conduct electricity. (.....)

2 (A) Give a reason for:

1. Helium is used to fill balloons and blimps.
.....

2. Rubber is used in making tires of cars.
.....

3. Copper is used in making electric wires.
.....

(B) Complete the following sentence:

- The body of cooking pots is made of, while the handles are made of or wood.

3 (A) Classify the following properties into physical and chemical properties:

1. Steel is strong and hard.
2. Helium is not poisonous and not flammable.
3. Glass is a transparent material.
4. Ash is formed when a piece of paper is burned.

(B) What happens if:

- You touch a handle of a hot cooking pot that is made of copper?
.....

Concept 2.3

Lesson 1

Self Assessment 21

15

1 (A) Complete the following sentences:

1. When water is heated, its particles move
2. Heat is a form of energy known as
3. Particles of liquids move than particles of gases.

(B) What happens to:

1. The mass of ice cubes when they melt?
.....
2. The kinetic energy of matter particles when they absorb thermal energy?
.....

2 (A) Cross out the odd word:

1. Ice – Ice cream – Water – Sand (.....)
2. Gasoline – Copper – Oil – Vinegar (.....)

(B) Write the scientific term:

1. A process by which matter is changed from a solid state to a liquid state. (.....)
2. The state of ice when it melts. (.....)

3 (A) Correct the underlined words:

1. As the kinetic energy of particles decreases, the matter becomes warmer. (.....)
2. Gas state is turned into liquid state by melting process. (.....)
3. Thermal energy from the moon keeps living organisms on Earth alive. (.....)

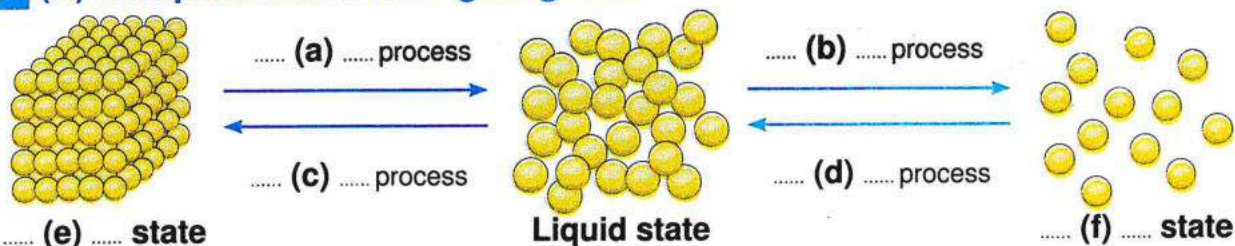
(B) Arrange the following words in a descending order according to the speed of their particles: (Butter - Helium - Water)

.....

(C) Choose the correct answer:

- The mass of milk and chocolate after mixing is the sum of the masses of milk and chocolate before mixing. (less than – equal to – more than)

1 (A) Complete the following diagram:



(B) Write the scientific term:

1. The state of water when its temperature is between 0°C to 100°C . (.....)
2. It is a change in the shape, size, or state of matter without any change in its structure. (.....)

2 (A) Cross out the odd word:

1. Condensation – Evaporation – Freezing – Cooling (.....)
2. Matter is cooled – Particles spread out – Particles speed decreases – Particles get closer (.....)
3. Increasing temperature – Particles move faster – Decreasing temperature – Particles gain energy (.....)

(B) What happens to the state of water when:

1. It is heated above 100°C ?
.....
2. It is cooled below 0°C ?
.....

3 (A) Correct the underlined words:

1. Kilogram is the measuring unit of temperature of matter. (.....)
2. The freezing process is the reverse of the evaporation process. (.....)
3. Matter can be changed from a state to another by changing its mass. (.....)
4. Melted chocolate can be returned into its solid state by condensation process. (.....)

(B) Give a reason for:

- We can see steam during cooking food.
.....

Concept 2.3

Lesson 3

Self Assessment 23

15

1 (A) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. To separate salt from salty water we can use	(a) Filtration process.
2. Freezing process is opposite to	(b) Condensation process.
3. To separate sand from water we can use	(c) Evaporation process.
4. Particles lose thermal energy during	(d) Melting process.

1. 2. 3. 4.

(B) Give a reason for:

- The Earth's atmosphere is a mixture.

2 (A) Correct the underlined word:

- On adding vinegar to sugar, a gas is formed. (.....)
- Seawater is considered as a compound. (.....)
- On adding 6 g of salt to 16 g of pepper, the mass of the mixture would be 10 g. (.....)

(B) Mention one example of each of the following:

- A mixture that is made of solid materials.
- A process used to separate mud from dirty water.

3 (A) Look at the opposite figure then Put (✓) or (x):

- The components of fruit salad combine chemically together. ()
- The fruit salad consists of solid components. ()
- The components of the fruit salad can be separated. ()
- Each type of fruit lose its taste after mixing them together to make this salad. ()



(B) Write the scientific term:

- A form of matter made of two or more substances that combine chemically together. (.....)

Concept 2.3

Lesson 4

Self Assessment 24

15

1 Classify the following examples into chemical change or physical change:

1. Coiling a wire to form a spring. (.....)
2. Frying an egg. (.....)
3. Photosynthesis process. (.....)
4. Digestion of food. (.....)
5. Decomposition process. (.....)

2 (A) Correct the underlined word:

1. On burning wood, rust is formed. (.....)
2. Making fruit salad is considered a chemical change of matter. (.....)
3. Adding iodine to cornstarch forming a new substance with a red color. (.....)

(B) Give a reason for:

- Folding a paper is a physical change.
-

(C) What happens if:

- Oxygen combines with carbon and hydrogen?
-

3 (A) Cross out the odd word:

1. Coloring a paper – Crushing a rock – Lighting a match – Melting wax (.....)
2. Bending a metal spoon – Spoiled food – Rusting of iron – Baking a cake (.....)
3. Shaping clay – Rotting on a toast – Sharpening a pencil – Grinding grains (.....)

(B) Complete the following sentences:

1. Rust is a reddish, thin layer called
2. On adding to baking soda , gas bubbles are formed.

Concept 2.3

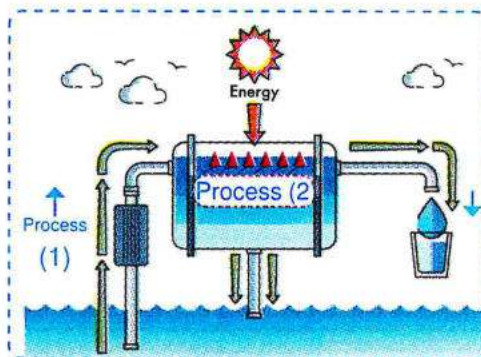
Lesson 5

Self Assessment 25

15

1 Look at the opposite diagram then Put (✓) or (X):

1. The water produced from process (1) is fresh water. ()
2. Salt and minerals evaporate during process (2). ()
3. Fish and seaweeds can be removed from seawater by process (1). ()
4. Water produced from process (2) is drinkable. ()
5. This diagram represents desalination process. ()



2 (A) Correct the underlined words:

1. About 90% of Earth is covered with salt water. (.....)
2. The only water that a thirsty person can drink is salty water. (.....)
3. Dehydration means human body gets water faster. (.....)

(B) Give a reason for:

1. Seawater is considered a mixture.

.....

2. Humans cannot drink seawater.

.....

3 (A) Mention two disadvantages of desalination process:

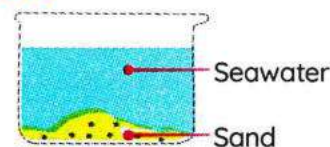
.....

(B) Arrange the following processes to obtain a drinkable water from the sample in the opposite figure:

(Evaporation - Condensation - Filtration)

.....

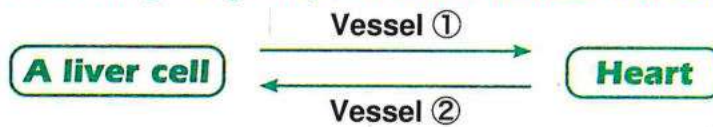
.....



(C) Complete the following sentence:

- Salts and can be separated from seawater by process.

1 (A) Study the following diagram, and then choose the correct answer:



- The vessel number ① represents
 (a) xylem (b) a vein (c) an atrium (d) an artery
- The vessel number ② carries
 (a) wastes and oxygen (b) carbon dioxide gas and wastes
 (c) nutrients and oxygen (d) water and wastes
- Blood moves in direction through vessel ① and vessel ②.
 (a) one (b) two (c) three (d) four

(B) Give a reason for:

- Vine tree and pine tree have different kinds of stems.

- Plants depend on humans and animals to make their own food during the photosynthesis process.

2 (A) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. Seeds are produced through	(a) germination process.
2. Seeds are transported from a place to another through	(b) reproduction process.
3. A seed grows and forms a new plant through	(c) seed dispersal process.

1. 2. 3.

(B) Write the scientific term:

- It pumps blood to the human body parts and receives it again. (.....)
- A plant part that anchors the plant in the soil. (.....)

3 (A) Cross out the odd word:

1. Fats – Starches – Oxygen gas – Sugars (.....)
2. Arteries – Veins – Blood capillaries – Atria (.....)
3. Roots – Stems – Blood – Leaves (.....)

(B) What happens if:

1. A plant is placed in a dark room for many days?

.....

.....

.....

2. There are no stomata on plants' leaves?

.....

.....

.....

4 (A) Complete the following sentences:

1. Green plants can make their own food through the process.
2. A growing seed in a wet paper towel needs to be transferred to to complete its growth.
3. Most flowers have stems.

(B) "A farmer found burdock seeds and maple seeds that weren't from his farm.", Explain at least two different ways that help each type of those seeds to reach the farm.

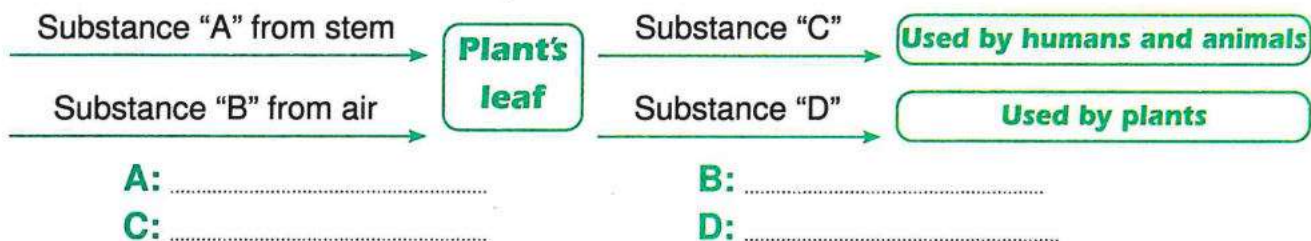
.....

.....

.....

.....

- 1 (A) Replace the substances "A", "B", "C" and "D" by the following words:
(Oxygen gas – Water – Glucose sugar – Carbon dioxide gas)



(B) What happens if:

- Plants' leaves don't have chlorophyll?
-

- 2 (A) The opposite figure shows a flower placed in a cup containing a red-colored water, Choose the correct answer:

- The color of of the flower turns into red.
 (a) phloem only (b) xylem only (c) xylem and leaves
- There are small tubes called that connect the flower's leaves to the stem.
 (a) xylem (b) veins (d) chlorophyll
- What happens to the water level in the cup over time?
 (a) It goes up.
 (b) It stays the same.
 (c) It goes down.



(B) Give a reason for:

- Sunlight is a basic need for plants to grow and survive.
-
-

- Flowers are the reproductive parts of many plants.
-
-

3 (A) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. Dandelion seeds	(a) are dispersed by sticking to animals' fur.
2. Coconut seeds	(b) are dispersed by wind.
3. Burdock seeds	(c) are dispersed by coming out with animals' stool.
4. Apple seeds	(d) are dispersed by floating on water.

1. 2. 3. 4.

(B) Compare between them plants and animals according to the way of getting their food:

Plants	Animals
.....	
.....	
.....	

4 (A) Complete the following sentences:

1. Stomata are present on plant's to allow air to pass through them.
2. Shrubs have stems.
3. are tiny vessels that connect arteries to veins.

(B) Mention one importance of each of the following:

1. Plant's leaves.

.....

2. Root hairs.

.....

1 (A) Look at the following figure, then choose the correct answer:

1. The dark objects in the center of the sunflower are called
 (a) stems (b) seeds (c) fruits
2. The main function of this flower is
 (a) making the plant's food
 (b) producing seeds
 (c) transporting materials
3. Sunflowers have a/an stem.
 (a) tuber (b) runner (c) upright



(B) Mention one importance of each of the following:

1. Plant's stem.

.....

2. Chlorophyll.

.....

2 (A) Complete the following sentences:

1. Pine trees have leaves that look like
2. The heart consists of two and two
3. Water and nutrients are carried from the plant's to its leaves through

(B) Put (✓) or (X):

- Air enters plants through their roots.

()

3 (A) Correct the underlined words:

1. Sunlight is not important for plants in their initial growth. (.....)
2. Water provides the plant with the needed energy to grow. (.....)
3. Vine tree has wood stem. (.....)

(B) Mention one example for each of the following:

1. Seeds that can be dispersed by wind.

.....

.....

.....

2. Seeds that can be stuck to animals' fur.

.....

.....

.....

4 (A) Compare between:

Arteries	Veins
They carry blood rich in(1)..... gas and(2)..... from the(3)..... to(4)..... .	They carry blood rich in(5)..... gas and(6)..... from the(7)..... to(8)..... .

(B) Give a reason for:

1. Life on Earth without plants would be impossible.

.....

.....

.....

2. Roots have an important role for plants in the photosynthesis process.

.....

.....

.....

1 (A) Put (✓) or (X):

1. Xylem helps to carry water and nutrients downward through the plant's stem. ()
2. Plant's roots, stem and flowers have a role in the photosynthesis process. ()
3. **Water plays an important role in dispersing small and light seeds.** ()

(B) What happens if:

1. The stomata of a plant get closed for a long time?

.....

.....

.....

2. Burdock seeds don't have any spines?

.....

.....

.....

2 (A) Look at the following figures, then complete:

1. The seeds in figure (.....) can be dispersed by the animals.
2. The light seeds in figure (.....) can be dispersed by



Figure (1)



Figure (2)

(B) Mention the importance of:

1. Human circulatory system.

.....

.....

.....

2. Flowers.

.....

.....

.....

3 (A) Compare between:

Phloem	Xylem
They carry(1)..... which is type of(2)..... from the plant's(3)..... to(4)..... .	They carry(5)..... and(6)..... from the plant's(7)..... to its(8)..... .

(B) Mention the type of stem in each of the following:

- Potato plant. (.....)
- The trunk of a mango tree. (.....)

4 (A) Write the scientific term:

- A liquid substance that humans, animals and plants need to grow and survive. (.....)
- The parts of the plant where water combines with carbon dioxide to produce sugar and oxygen gas. (.....)

(B) What happens if:

- A plant can't get carbon dioxide from air?

.....

.....

.....

(C) Cross out the odd word:

- Roots – Flowers – Leaves – Stem (.....)
- Blood capillaries – Vein – Arteries – Heart (.....)

1 (A) Study the following food chain, then complete the sentences below:



1. Photosynthesis process is carried out by while process is carried out by bacteria.
2. Energy directly transfers from the to the mouse.
3. is a large meat-eating animal.

(B) Give a reason for:

- The waste material produced from millipedes is very important for the soil.

.....

.....

.....

2 (A) Compare between:

P.O.C	Prey	Predator
Definition		
		
		
		
		

(B) Cross out the odd word:

1. Bacteria – Locusts – Millipedes – Fungi (.....)
2. Insects – Alligators – Grasses – Birds (.....)
3. Eagle – Hawk – Rabbit – Caracal (.....)

3 (A) Choose the correct answer:

- When a bird eats an insect, the
 (a) bird is a prey (b) bird is a primary consumer
 (c) insect is a predator (d) bird is a predator
- Human gets energy indirectly from producers when he eats
 (a) tomatoes (b) chicken (c) grapes (d) bread
- Many insects are considered as
 (a) producers (b) decomposers
 (c) primary consumers (d) secondary consumer

(B) Correct the underlined words:

- In a food chain, the energy flows from a tertiary consumer to a secondary consumer. (.....)
- Producers are the final link in any food chain. (.....)

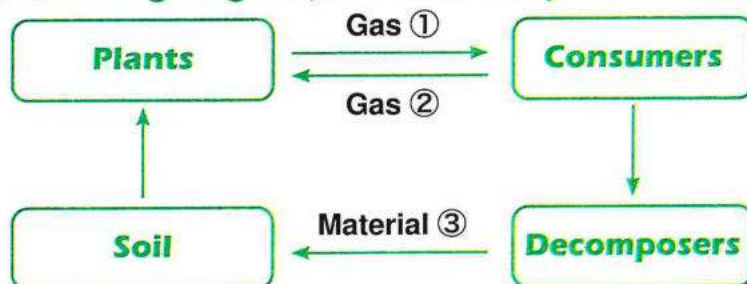
4 (A) Put (✓) or (X):

- It is better for a predator to depend on only one species of prey. ()
- Decomposers don't need energy to survive. ()

(B) Write the scientific term:

- They are organisms that eat other living organisms to get their energy. (.....)
- An area that provides food, water and shelter to all living organisms that live in it. (.....)
- The interaction among many food chains. (.....)

1 (A) Study the following diagram, and then complete the sentences below:



1. The gas number ① is produced during process.
2. The gas number ② is produced during process.
3. The material number ③ is produced during process and this material is rich in

(B) Give a reason for:

- Decomposers play an important role in the ecosystem.

2 (A) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. Producers	Ⓐ get energy by eating plants.
2. Herbivores	Ⓑ get energy by eating another animals.
	Ⓒ get energy directly from the sun.

1. 2.

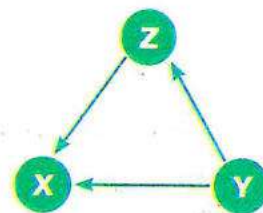
(B) Mention one example for each of the following:

1. An animal that gets energy by eating a hawk. (.....)
2. A way of seed dispersal for light seeds. (.....)
3. An ecosystem. (.....)

3 (A) Choose the correct answer:

1. What are the living organisms which the letter X, Y and Z represent in the opposite diagram:

	X	Y	Z
(a)	Human	Rabbit	Carrot
(b)	Rabbit	Human	Carrot
(c)	Carrot	Rabbit	Human
(d)	Human	Carrot	Rabbit



2. occupy the second link in a food chain.

- (a) Plants (b) Decomposers
(c) Producers (d) Primary consumers

3. Energy directly flows from

- (a) an eagle to a mouse (b) a mouse to grasses
(c) a rabbit to a caracal (d) a hawk to a frog

(B) Compare between:

Food chain	Food web
.....	
.....	
.....	

4 (A) Put (✓) or (X):

1. An animal can be a prey and a predator in the same time. ()
2. Your body doesn't need energy during sleeping. ()

(B) Write the scientific term:

1. The group of living organisms that can make their own food. (.....)
2. The sugar manufactured inside plants during photosynthesis process. (.....)

(C) What happens to:

- The soil fertility when worms and millipedes living in it, disappear?

- 1 (A) Study the following figures, then answer the following questions:



Area (A)



Area (B)

1. In which area does the hawk have different resources of energy?

2. In which area the hawk may die? And why?

3. What happens to the energy inside the hawk's body when it dies?

(B) Complete the following sentences:

- The waste materials produced from worms and are rich in nutrients that increase the
- Human is considered as a organism.

2 Choose the correct answer:

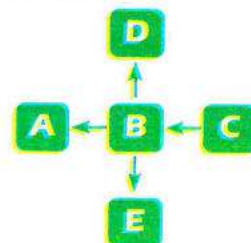
- The energy from the sun directly passes to
 (a) a mouse (b) a bean plant (c) a hawk (d) a worm
- In a food chain, could be preys for secondary consumers.
 (a) plants (b) primary consumers
 (c) decomposers (d) tertiary consumers
- All the following organisms are examples of decomposers, except
 (a) millipedes (b) fungi (c) bacteria (d) trees

(B) Write the scientific term:

- The first link in a food chain. (.....)
- The consumer that hunts and eats another animal. (.....)

3 (A) Study the opposite diagram, then complete the sentences below:

- Letter (.....) represents a producer.
- Letter (.....) represents a herbivore.



(B) Give a reason for:

- Rabbits are considered as primary consumers.

.....

.....

- Consumers depend on producers to get their energy.

.....

.....

(C) What happens to:

- The number of secondary consumers, when the numbers of primary consumers in an ecosystem increases?

.....

.....

4 (A) Compare between:

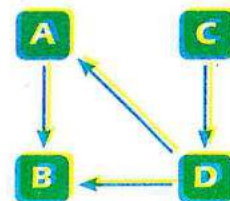
P.O.C	Producers	Decomposers
Definition		
Example		

(B) Form food chain by using the following organisms:

- Bacteria – Hawk – Eagle – Seeds – Squirrel

.....

1 (A) Study the following food web, and then complete the sentences below:



1. Letter (.....) represents a producer.
2. Letter (.....) represents a tertiary consumer.

(B) Give a reason for:

1. Soil fertility depends on decomposers.

.....

2. The sun is very important for all living organisms.

.....

3. Hawks depend on plants to get their energy.

.....

4. Humans need to eat some animals and plants.

.....

2 (A) Complete the following sentences:

1. and the we breathe provide us with needed energy.
2. consumers are known as herbivores.
3. We need energy during doing exercises than that we need during sleeping.
4. Birds are considered as that feed on

(B) Put (✓) or (X):

- Spiny seeds are dispersed by sticking to animals' fur and human's clothes. ()

3 (A) Choose the correct answer:

1. All the following are sources of food for a primary consumer, except
 (a) seeds (b) grasses (c) beetles (d) plants' leaves
2. The energy in glucose present in plants' leaves directly flows to
 (a) a deer (b) a shark (c) a snake (d) an eagle
3. Predators could be
 (a) producers (b) primary consumers
 (c) decomposers (d) secondary consumers

(B) What happens if:

1. All primary consumers disappear from a food chain?

2. Sunlight can't reach the Earth's surface?

4 (A) Cross out the odd word:

1. Rabbit – Mouse – Duck – Caracal (.....)
2. Fox – Hawk – Bacteria – Snake (.....)

(B) Write the scientific term:

1. The gas released from photosynthesis process. (.....)
2. The main source of energy for all living organisms on Earth. (.....)
3. It is a model that shows how the energy flows from one organism to another in an ecosystem. (.....)

- 1** (A) Study the following food chain, then complete the sentences below using the words (increase - decrease):

Grasses → Grasshoppers → Birds

- If all birds migrate to another ecosystem, the number of the grasshoppers
- If this ecosystem has less amount of grasses and more birds, the number of grasshoppers

(B) What happens to:

- Coral reefs if the temperature of seawater rises?

.....

- Living organisms if a damaged habitat is not restored?

.....

- 2** (A) Choose from column (A) what suits it in columns (B) and (C):

Column (A)	Column (B)	Column (C)
1. Bacteria	(a) are producers	(a) provide shelter for marine organisms.
2. Corals	(b) are ecosystems	(b) can make their own food.
3. Coral reefs	(c) are consumers	(c) decay the dead organisms.
4. Microorganisms	(d) are decomposers	(d) feed on zooplankton.

1. 2. 3. 4.

(B) Mention two human activities that harm marine environment.

.....

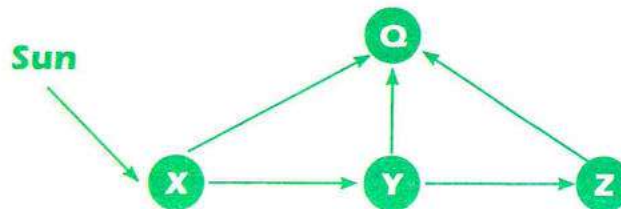
3 (A) Choose the correct answer:

- Algae are found in the of the food chain.
 (a) end – marine (b) beginning – desert
 (c) beginning – marine (d) end – desert
- Seabirds feed on
 (a) microorganisms (b) small fish
 (c) big fish (d) sharks
- Both sea turtles and are found in the same marine food chain.
 (a) eagles (b) lions (c) deers (d) jellyfish

(B) Write the scientific term:

- They are consumers that exist at the top of the food chains. (.....)
- An area in the ocean where scientists take care of small pieces of coral until they grow up. (.....)

4 (A) Study the following food chain, and then complete the sentences below:



- Letter “.....” represents a decomposer, while letter “.....” represents a producer.
- Letter “.....” is a prey for letter “Z”.

(B) Complete the following sentences:

- When plastic products are exposed to sunlight, they are broken down into small pieces called
- Removing plants from riverbanks causes to be more dangerous.

1 (A) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. Jellyfish	(a) dive deep in seawater to feed on small fish.
2. Triggerfish	(b) are prey for sea turtles.
3. Seabirds	(c) feed on parrotfish and butterflyfish.
4. Sharks	(d) feed on corals.

1. 2. 3. 4.

(B) Give a reason for:

- Plastics are very harmful to marine organisms.

.....

2 (A) What's meant by each of the following:

1. Population?

.....

2. Habitat restoration?

.....

(B) Form a food chain using the following organisms:

- Bacteria – Seabirds – Microorganisms – Small fish

.....

(C) Cross out the odd word:

1. Sea urchin – Butterflyfish – Algae – Parrotfish

(.....)

2. Sea star – Clam – Zooplankton – Squirrel

(.....)

3 (A) Choose the correct answer:

1. The suitable habitat for microorganisms to survive is water.
☐ (a) hot ☐ (b) cold ☐ (c) warm ☐ (d) boiled
2. Habitat loss causes of living organisms.
☐ (a) reproduction ☐ (b) growth ☐ (c) extinction ☐ (d) survival
3. In this food chain: Carrots → Rabbits → Foxes, If a farmer plants more carrots and foxes are kept out the farm, what happens to the rabbit's population?
☐ (a) It decreases. ☐ (b) It increases.
☐ (c) It stays the same. ☐ (d) It disappears.

(B) Mention one example for each of the following:

1. A top predator in a marine food web.

.....

.....

2. Producers present in a in a marine food web.

.....

.....

4 (A) Mention the importance of each of the following:

1. Coral reefs for marine organisms.

.....

.....

2. Nursery.

.....

.....

(B) What happens if:

1. Plastic products are exposed to sunlight?

.....

2. The seawater temperature rises? (According to microorganisms)

.....

3. The climate change is unsuitable for a population of one type of species?

.....

1 (A) Study the following food chain, then complete the sentences below:

Algae → Zooplankton → Shrimps → Crabs

1. Crabs are considered as consumers.
2. When the number of shrimps increases, the number of decrease.

(B) Give a reason for:

1. Grasses are considered as producers in a desert ecosystem.

.....

2. Gentle rain has a positive effect on a desert ecosystem.

.....

3. Microorganisms float on the water surface.

.....

2 (A) Write the scientific term:

1. A human activity that leads to decreasing the number of fish and affecting many marine food webs. (.....)
2. Any increase or decrease in the number of organisms. (.....)
3. It is a condition in which coral reefs turn completely into white. (.....)
4. Marine ecosystems that provide food and shelter for many marine organisms. (.....)

(B) Cross out the odd word:

- Clam – Corals – Zooplankton – Sea urchin (.....)

3 (A) Choose the correct answer:

1. If the amount of grass in an ecosystem increases, this directly causes the increase in the number of in this ecosystem.
 (a) hawks (b) rabbits (c) caracals (d) sharks
2. In an extreme hot climate, the water in a lake
 (a) decreases due to evaporation (b) increases due to evaporation
 (c) has a lower temperature (d) changes into ice

(B) What happens to:

1. The number of marine organisms, when the amount of plastic increase in the sea?

2. Seabirds when there's no enough food sources?

3. Hares(Rabbits) if all the grass were removed from an ecosystem?

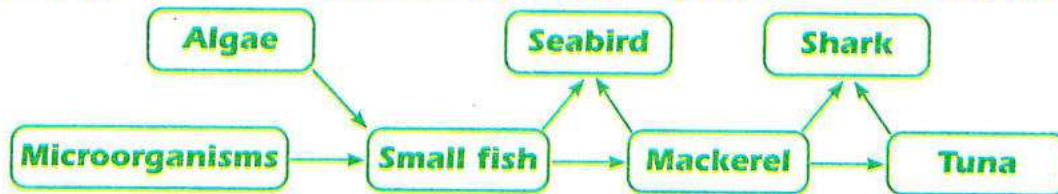
4 (A) Put (✓) or (x):

1. On introducing a new predator to an ecosystem, the number of preys in this ecosystem will not be affected. ()
2. There are no decomposers in a marine ecosystem. ()

(B) Complete the following sentences:

1. When corals seawater, they get harmed as they ingest in it.
2. cannot differentiate between a jelly fish and a piece of
3. A prey gives to the when it feeds on it.

1 (A) Study the following food web, then complete the sentences below:



1. is a food source for both seabirds and sharks.
2. are tiny living organisms that can't be seen by human eye.
3. A decrease in the shark population would lead to an increase in the population of and
4. Seabird is considered a secondary consumer when it feeds on, while it is considered a tertiary consumer when it feeds on

(B) Form a food chain using the following living organisms:

- Clam – Algae – Shark – Sea star

2 (A) Put (✓) or (X):

1. Corals and zooplankton make their own food by photosynthesis process. ()
2. In "Zero plastics" project, the usage of plastic products is reduced by 0 %. ()

(B) Give a reason for:

1. Coral bleaching occurs when the water temperature rises.
.....
2. Algae are considered as producers.
.....
3. When the number of one species of consumers in an ecosystem increases, they will die.
.....

3 (A) Choose the correct answer:

1. The place where scientists take care of small pieces of corals until they grow up is located in the
 (a) sea (b) desert (c) forests (d) air
2. In a forest, if most of the insects disappear, what will likely happen to the birds that eat insects?
 (a) Their number will increase. (b) Their number will decrease.
 (c) Their number will stay the same. (d) They will start eating plants.
3. Decomposers help an ecosystem by
 (a) producing oxygen (b) eating predators
 (c) Making new plants (d) breaking down dead organisms

(B) Mention two factors that negatively affect the coral.

.....

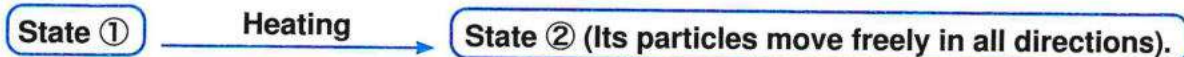
4 (A) Cross out the odd word:

1. Grasses – Algae – Trees – Seabirds (.....)
2. Sharks – Butterflies – Lions – Crocodiles (.....)

(B) Complete the following sentences:

1. Algae use the energy of the sun to make their own food.
2. A gentle rain will a desert ecosystem, while flooding will it.
3. projects allow scientists to decrease the harms that occur the ecosystem.

1 (A) Study the following diagram, then complete the sentences below:



1. The state number ① represents a state of matter.
2. The state number ② represents a state of matter.
3. The particles of state number can slide over each other, so they have a/an shape.

(B) Put (✓) or (X):

- Frozen vegetables have no definite shape. ()

2 (A) Choose the correct answer:

1. Particles of are organized and have a regular pattern.
 (a) liquids only (b) gases only (c) solids only (d) liquids and solids
2. When you squeeze a balloon filled with air,
 (a) the air particles get closer (b) the balloon size increases
 (c) the air particles spread out (d) the balloon inflates

(B) What happens to:

1. The arrangement of ice particles after melting?

2. The shape and the volume of a coin when we place it into a container?

3. The speed of water particles when it changes into steam?

3 (A) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. Thermometer	a is used to measure the length of a classroom.
2. Balance	b is used to measure the temperature of a liquid.
	c is used to measure the mass of your bag.

1. 2.

(B) Write the scientific term:

- The state of matter that has medium spaces between its particles. (.....)
- The amount of space that matter occupies. (.....)
- A model of the whole Earth that has the shape of a large ball. (.....)

4 (A) Cross out the odd word:

- Milk – Wood – Light – Steam (.....)
- Oil – Iron – Vinegar – Gasoline (.....)

(B) Mention one importance of each of the following:

- Germ model.
.....
.....
- Electron microscope.
.....
.....

(C) What is meant by:

- Matter?
.....
.....

1 (A) Put (✓) or (X):

- Ice has a fixed shape because it is a liquid matter.

()

(B) What happens to:

- The shape and the volume of an amount of liquid on transferring it to a different container?

.....

- The speed of water particles after freezing?

.....

(C) Write the scientific term:

- It is anything that has a mass and takes up space.
- The tool used to measure the length of a wall.

(.....)

(.....)

2 (A) Choose the correct answer:

- When water is boiled, it turns into

(a) ice (b) gas state (c) liquid state (d) solid state

- Both and have the same state of matter.

(a) milk – plastic (b) steam – wood
(c) sand – oil (d) gasoline – vinegar

(B) Give a reason for:

- Sugar is a matter.

.....

- Carbon dioxide has no definite shape or volume.

.....

- Salt is a solid matter.

.....

3 (A) Compare between each of the following:

P.O.C.	Liquid State	Gas state
Shape		
Volume		
Movement of its particles		

(B) Cross out the odd word:

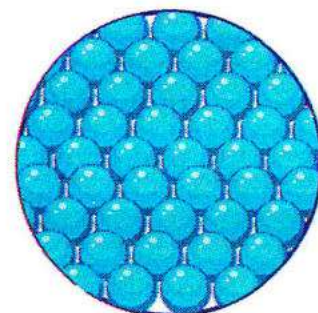
1. Water vapor – Oil – Natural gas – Oxygen. (.....)
2. Wood – Sand – Glass – Air. (.....)

4 (A) Arrange the following substances ascending according to the energy of their particles: (Milk - Steam - Gold)

.....

(B) Study the opposite figure, and then complete the sentences below:

1. The opposite figure presents the particles of the state of matter.
2. The particles in this figure and move around their places.
3. When the particles in this figure is heated, they move and the spaces between them



1 Look at the following figures, and then complete:

1. Particles in figure (.....) move very freely.
2. Particles in figure (.....) are packed tightly.
3. Particles in figure (.....) can slide over each other.


Figure (1)

Figure (2)

Figure (3)
(B) Give a reason for:

1. The shape of water changes when it is transferred from a container to another that has a different shape.

.....

2. We need to use an electron microscope to see particles of matter.

.....

2 (A) Put (✓) or (X):

1. Particles of solids have low energy, so they don't move at all. ()
2. When increasing the spaces between the particles of a liquid matter, it changes into a gas matter. ()

(B) Write the scientific term:

1. The substances that take the shape and the volume of their containers. (.....)
2. The device used to examine objects that are too small to be seen with the naked eye. (.....)
3. A copy that is similar to a real thing which we can't be observed with our eyes. (.....)

3 (A) Choose the correct answer:

1. doesn't take the shape of the container.
 (a) Milk (b) Air (c) Iron (d) Oil
2. Particles of vinegar move faster than the particles of
 (a) steam (b) oxygen (c) carbon dioxide (d) gold
3. The state of matter changes by changing its
 (a) size (b) mass (c) color (d) temperature

(B) What happens to:

1. The size of the balloon when you blow it up?

.....

.....

2. The spaces between particles of ice when it melts?

.....

.....

4 (A) Complete the following sentences using the words below:

(Solid - Liquid - Gas)

1. matter completely fills its container.
2. matter takes only the shape of its container.
3. matter has a fixed shape.

(B) What is meant by each of the following:

1. Volume?

.....

.....

2. Particles?

.....

.....

3 (A) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. Oxygen	(a) has a fixed shape and volume.
2. A coin	(b) is not matter but it is a form of energy.
3. Light	(c) has variable shape and volume.

1. 2. 3.

(B) Give a reason for:

1. Particles of a gas can spread out and fill up a container it is placed in.

.....

2. Particles of wood are packed tightly together.

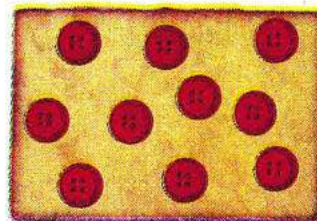
.....

2 (A) Complete the following sentences:

- When you pour some tea from a pot into a glass cup, the of the tea changes.
- When you blow a balloon up, air particles exert a that inflates the balloon and gives it its round shape.
- Coal is considered as a state of matter.

(B) The following figure that represents a model of liquid state,
Choose the correct answer:

- The buttons are arranged in a pattern.
(a) regular (b) random
- If we want to make a model for a gas state we need to the distances between these buttons.
(a) increase (b) decrease



3 (A) Put (✓) or (X):

1. Two equal amounts of flour and salt can take up the same space at the same time. ()
2. Particles of all matters are in a continuous motion. ()
3. Particles of a piece iron are similar to the particles of a piece of wood. ()

(B) What happens to:

1. The arrangement of water particles after freezing?

.....

.....

2. State of ice when it melts?

.....

.....

3 (A) Write the scientific term:

1. The state of matter that has indefinite shape and volume. (.....)
2. They are the building units of matter. (.....)

(B) Study the following figures, then complete the below sentences:



Figure (1)

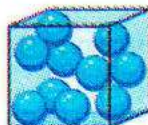
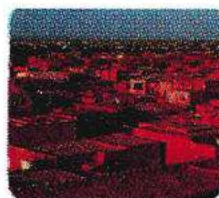


Figure (2)

1. The particles in figure (1) has energy than the particles in figure (2).
2. The particles in both figures have an indefinite
3. The particles in figure (2) move at speed than the particles in figure (1).

1 (A) Look at the following figures, and then complete the following sentences:

1. The roof of home (1) is and made up of
2. The roof of home (2) is and made up of



Home (1)



Home (2)

(A) Put (✓) or (X):

1. You can distinguish between iron and gold using the sense of sight. ()
2. Equal masses of different matters have equal volumes. ()
3. When matter particles move quickly, its temperature increases. ()

2 (A) Compare between each of the following:

1.

P.O.C.	Helium	Rubber
Usage		

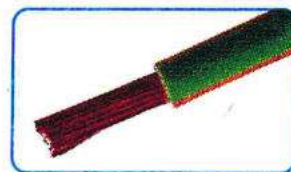
2.

P.O.C.	Mass	Volume
Measuring tool		

(B) Give a reason for:

- Electric wires are made up of copper.

.....
.....



3 (A) Choose the correct answer:

1. One kilogram of oranges and one kilogram of apples have the same

- ☐ (a) type of particles ☐ (b) color
☐ (c) volume ☐ (d) mass

2. All the following are physical properties of matter, except

- ☐ (a) texture ☐ (b) color ☐ (c) rusting ☐ (d) shape

3. Steel is used in making hammers because it is

- ☐ (a) hard ☐ (b) smooth ☐ (c) flexible ☐ (d) transparent

(B) What happens:

1. If you approach a magnet to some paper clips?

.....

.....

2. To the mass of an aluminum foil, if you crumble it?

.....

.....

4 (A) Cross out the odd word:

• Helium – Rubber – Copper – Aluminum (.....)

(B) Complete the following sentence:

1. You can measure the height of a table by using

2. $1000 \text{ cm}^3 = \dots\dots\dots$ milliliters.

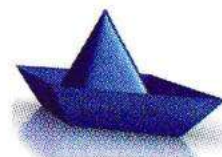
3. The of a substance can be measured by the thermometer.

4. Handles of cooking pans can be made up of and

1 (A) Look at the following figures, then give a reason for:

1. Folding paper to make a boat is a physical change.

.....



2. Burning a piece of paper is a chemical change.

.....



(B) Complete the following sentence:

1. Different materials are used to make roofs of homes depending on the where the home is located.

2. The taste of apple is from the properties of apple.

3. The mass of one thousand of paper clips equals kilogram(s).

2 (A) Correct the underlined words:

1. Changing the shape of matter effects on its mass. (.....)

2. By increasing the speed of matter particles, its temperature decreases. (.....)

3. Equal volumes of different substances have equal masses. (.....)

(B) Write the scientific term:

1. The transparent material used to make light bulbs. (.....)

2. The property of matter that can be measured by the measuring cup. (.....)

3 (A) Choose from column (A) what suits it in columns (B) and (C):

Column (A)	Column (B)	Column (C)
1. Steel	(a) is flexible,	(a) is used in making athletic shoes.
2. Helium	(b) is hard,	(b) is used in filling blimps.
3. Rubber	(c) is a light gas,	(c) is used in making screwdrivers.

1. 2. 3.

(B) Mention one importance of each of the following:

1. Scale.

.....

2. Thermometer.

.....

4 (A) Choose the correct answer:

- Which of the following properties of matter cannot be measured by a tool?
 (a) Length. (b) Mass. (c) Taste. (d) Volume.
- When you have a bite from an apple, so the mass of the remaining part of the apple
 (a) increases (b) decreases (c) doubles (d) remains constant
- The home of zone is made up of sticks and leaves.
 (a) tropical (b) desert (c) polar (d) cold climate

(B) Cross out the odd word:

- Milliliter – Liter – Cm^2 – Cm^3 (.....)
- Iron nail – Plastic spoon – Rock – Cork (.....)

1 (A) Classify each of the following into physical or chemical properties:

1



Burning wood

2



Smoothness of a feather

3



Rusting of an iron nail

(B) What happens if:

1. The roof of a cold weather home was flat?

.....

.....

2. You touch the handle of a hot cooking pan made of copper?

.....

.....

2 (A) Put (✓) or (X):

1. All materials which have large masses must have large volumes. ()

2. If you fold a piece of cloth, its mass and shape would change. ()

3. Changing the size of matter doesn't affect its mass. ()

(B) Mention one importance of each of the following:

1. Measuring cup.

.....

.....

2. Tape measure.

.....

.....

3 (A) Compare between:

P.O.C.	Mass	Volume
Definition		
Measuring unit		

(B) Cross out the odd word:

- Gloves – Athletic shoes – Car tires – Hammers (.....)

4 (A) Choose the correct answer:

- All the following materials are used to build homes except
 (a) ceramics (b) stones (c) sticks (d) air
- We can identify the color of a substance by the sense of
 (a) sight (b) taste (c) touch (d) hearing
- If a cushion and an iron cube has the same amount of matter, so the cushion has that of the iron cube.
 (a) equal volume to (b) larger volume than
 (c) smaller volume than (d) half the volume

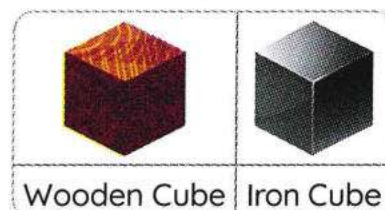
(B) Write the scientific term:

- A metal that stretched into thin and flexible electrical wires. (.....)
- The property of matter that is measured by the thermometer. (.....)

- 1 (A) Study the figures, and then complete the following sentences from the words bank:**

(iron – wooden – volume – masses – sinks in – floats on)

- The two cubes have the same
- The two cubes have different
- The wooden cube the water surface.
- A magnet can attract the cube.



(B) Write the scientific term:

- It is a measure of how quickly the particles in a matter are moving.

(.....)

- 2 (A) Compare between each of the following:**

P.O.C.	A roof of a tropical home	A roof of a desert home
Is made up of	 (1)	 (3)
Reason	To protect it from (2)	To protect it from (4)

(B) Give a reason for:

- When the matter particles move quickly, its temperature increases.

.....

- The body of cooking pans is made of copper.

.....

- Helium can be used safely.

.....

3 (A) Put (✓) or (X):

1. People in polar zones use ceramic tiles to build homes that has a flat roof to resist rain. ()
2. You can differentiate between the components of salt and flour mixture by using the touching sense only. ()
3. The spicy taste of pepper is among the pepper's physical properties. ()

(B) Mention one example of each of the following:

1. A water proof material. (.....)
2. A nonflammable gas. (.....)

4 (A) Complete the following sentences:

1. The taste of apple is from properties of apple.
2. When the substance particles move quickly, they produce more energy.
3. One kilogram of water has a of 1000 cm³.

(B) Cross out the odd word:

1. Milliliter – Measuring cup – Cubic centimeter – Liter (.....)
2. Balance – Gram – Thermometer – Ruler (.....)

1 (A) Observe the opposite figure, then complete the sentences below:

1. The process occurring to the ice cream is called
2. This process doesn't affect the of the ice cream.
3. The ice cream changes from a solid state to a state as its temperature



(B) Give a reason for:

- The Earth's atmosphere is a mixture.

2 (A) Classify the following situations into chemical and physical change:

- | | |
|-------------------|---------|
| 1. Frying an egg. | (.....) |
| 2. Iron rusting. | (.....) |
| 3. Making salad. | (.....) |

(B) What happens to:

1. The speed of water particles, when it is heated?

.....

2. The state of water, when it is heated above 100°C?

.....

3 (A) Choose the correct answer:

- When a matter absorbs energy, its particles vibrate and move faster.
 (a) chemical (b) sound (c) light (d) potential
- All the following are examples of physical changes, except
 (a) cutting fruits (b) burning a paper
 (c) coloring a paper (d) melting wax
- On mixing 15 grams of salt with an amount of sugar, the total mass of the mixture becomes 25 grams, so the mass of sugar is grams.
 (a) 40 (b) 5 (c) 15 (d) 10

(B) Write the scientific term:

- A process by which matter changes from a gas state to a liquid state. (.....)
- The changes in matter which are usually reversible and don't affect its structure. (.....)

4 (A) Put (✓) or (X):

- Evaporation is a method of mixture formation. ()

(B) Complete the following sentences:

- The form of energy which is used in cooking food and warming houses is called
- The distance between particles of water is than that between the particles of water vapor.
- A mixture of sand and rocks is made up of materials.
- process is used to separate sand only from salty water.

1 (A) Observe the opposite figure, then choose the correct answer:

- Process ① is opposite to
 (a) process ② (b) process ③
- The particles of ice energy.
 (a) gain (b) release
- All processes occurring in this figure are examples of a change.
 (a) physical (b) chemical



(B) What happens if:

- Mixing vinegar and baking soda?

- Salty water is heated for a long time?

2 (A) Choose the correct answer:

- The speed of particles movement increases during process.
 (a) freezing (b) evaporation (c) condensation (d) cooling
- A chemical change occurs when a piece of paper.
 (a) folding (b) cutting (c) coloring (d) burning
- Salt can be separated from salty water by process.
 (a) melting (b) evaporation (c) filtration (d) condensation

(B) Mention one example of each of the following:

- A chemical change that occurs to iron.
- A gaseous mixture.

3 (A) Put (✓) or (X):

1. About 70 % of Earth's surface is covered with salty water in oceans and rivers. ()
2. Sugar keeps its sweetness taste after burning. ()
3. When matter absorbs light energy, its temperature increases. ()

(B) Give a reason for:

1. You can't drink the water of oceans and seas.

.....

.....

2. Burning wood is a chemical change.

.....

.....

4 (A) Compare between each of the following:

P.O.C	Freezing	Evaporation
Definition		
Motion of matter particles		

(B) Cross out the odd word:

- Crushing a rock – Grinding sugar – Cutting fruit – Burning of wax (.....)

1 (A) Cross out the odd word:

1. Making bread – Melting of wax – Burning sugar – Rusting of iron
(.....)
2. Salty water – Vegetable salad – Air – Sugar
(.....)
3. Breaking of glass – Boiling of water – Making cake – Coiling a paper
(.....)

(B) Mention one example of each of the following:

1. A chemical change that occurs to wood. (.....)
2. A mixture that contains solid materials only. (.....)

2 (A) Correct the underlined words:

1. Heat is a form of matter. (.....)
2. 100°C is the freezing point of water. (.....)

(B) Give a reason for:

1. Filtration process can't be used to separate salt from salty water.
.....
.....
2. Components of a mixture can be easily separated.
.....
.....
3. Making fruit salad is a physical change.
.....
.....

3 (A) Choose the correct answer:

- Ice turns into liquid water, when its increases.
 (a) mass (b) shape (c) color (d) temperature
- After mixing and a new substance is formed.
 (a) salt – water (b) iodine – cornstarch
 (c) oil – water (d) salt – sugar
- Water vapor into water droplets when it touches a cold surface.
 (a) melts (b) condenses (c) evaporates (d) freezes

(B) Write the scientific term:

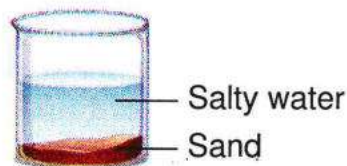
- A matter that is formed when two or more materials combine chemically. (.....)
- It is the process of removing salts from water. (.....)

4 (A) Complete the following sentences:

- Dissolving sugar in water is a change, while burning it is a change.
- is produced when oxygen combines with carbon and hydrogen that starts a
- Some shiny metals lose their shining due to reacting with gas and forming rust.
- When a piece of butter melts, it changes from the state to the state.

(B) How can you separate sand and salt from the mixture in the opposite figure?

.....



1 (A) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. Freezing process	Ⓐ is the change of matter from a solid state to a liquid state.
2. Condensation process	Ⓑ is the change of matter from a liquid state to a gas state.
3. Evaporation process	Ⓒ is the change of water from a gas state to a liquid state.
4. Melting process	Ⓓ is the change of water from a liquid state to a solid state.

1. 2. 3. 4.

(B) Write the scientific term:

- A change in matter with a change in its structure producing a new substance.

(.....)

2 (A) Observe the following diagram, then put (✓) or (X):

- Ice cubes start to melt when its temperature becomes below 0°C . ()
- Process (1) is a reverse of process (2). ()
- During process (1), the spaces between the water vapor particles increase. ()



(B) What happens if:

- Adding iodine to cornstarch?

.....

- A wet iron nail is exposed to oxygen for a long period of time?

.....

- (B) Mention an example for:**

- 4 (A) Choose the correct answer:**

- (A) Give a reason for:**

1. Making bread is a chemical change.

.....

2. Formation of water drops when water vapor touches a cold surface.

3. When the temperature of ice cubes increases, they melt.

.....

.....

Assess Your Learning

School Book Questions on **Unit 1**

1 Choose the correct answer:

- 1 is the main source of energy for all living organisms.
a. Food **b.** Water
c. Sun **d.** Moon
- 2 absorb the sunlight that the plant needs to make its own food.
a. Roots **b.** Leaves
c. Xylems **d.** Stems
- 3 All the following are considered producers, except
a. grass **b.** hawks
c. seeds **d.** fruits
- 4 can make their own food.
a. Plants **b.** Humans
c. Animals **d.** Plants and some animals
- 5 return the blood that carries carbon dioxide back to the heart.
a. Lungs **b.** Xylems
c. Arteries **d.** Veins
- 6 If the pollution in an ecosystem increases, the population of the living organisms
a. increases **b.** decreases
c. stays the same **d.** doesn't change

2 Compare between the following:

- 1 What happens to the plant in the presence of light and in darkness.
- 2 Transportation in plants and humans.
- 3 Producers and consumers.

3 Put (✓) or (x):

- 1 In plants, the light energy is converted into chemical energy. ()
- 2 The vessels of the transport system of the human body differ from those in the plant, and both don't have the same role. ()
- 3 Living organisms depend on each other to get energy. ()
- 4 The ecosystem consists of living organisms only. ()
- 5 A food web is a group of linked (interconnected) many food chains that show the different feeding relationships. ()
- 6 Human activities affect only the living organisms in the environment. ()

4 Rewrite the following sentences after correcting the underlined words:

- 1 Consumers help in the decomposition of the remains of plants and dead animals into nutrients that can be returned to the ecosystem.
- 2 Rising the temperature of the water turns the color of the coral reefs into green.
- 3 Producers need moonlight to make the photosynthesis process.

5 Answer the following:

Eagle



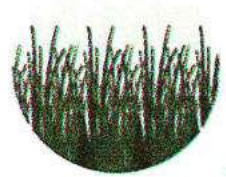
Snake



Mouse



Grass



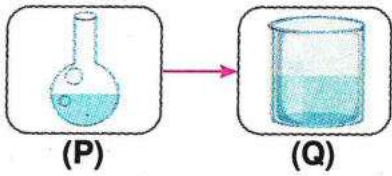
- Form a food chain using the previous living organisms.

Assess Your Learning

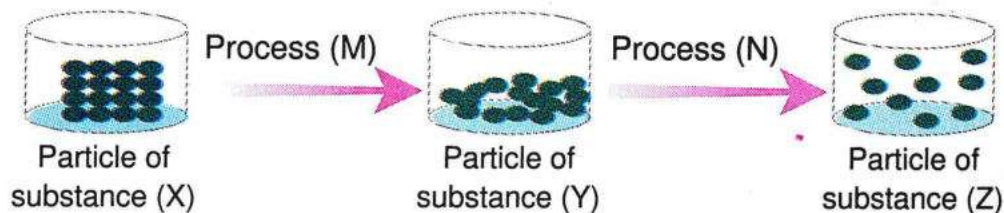
School Book Questions on Unit 2

Choose the correct answer:

- 1 Which substance(s) in the following (water vapor, oxygen, and nitrogen) can be compressed (squeezed)?
a. Water vapor and oxygen only. **b.** Oxygen and nitrogen only.
c. Water vapor and nitrogen.
d. Water vapor, oxygen, and nitrogen.
- 2 On transferring an amount of oil from container (P) to container (Q) as in the opposite figure, which change of the following may occur?

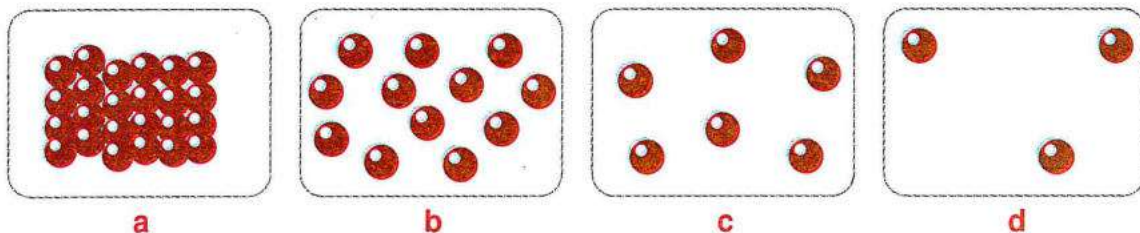


a. A change in volume. **b.** A change in mass.
c. A change in shape. **d.** A change in temperature.
- 3 Ice cubes melt when they gain energy.
a. electrical **b.** light **c.** sound **d.** thermal
- 4 is the process in which water changes into ice.
a. Melting **b.** Freezing **c.** Evaporation **d.** Condensation
- 5 Choose the wrong sentence in the following sentences:
a. Matter exists in three states.
b. Matter changes from one state to another.
c. A new substance is produced from the chemical reaction.
d. Ice is heavier than water.
- 6 Study the following diagram, then choose the correct answer:



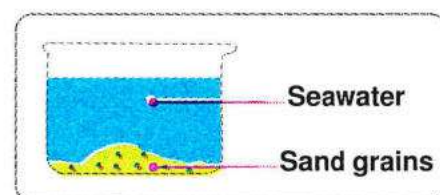
- a.** (X) is a solid state – (Z) is a gaseous state – (M) is the melting process.
- b.** (X) is a solid state – (Y) is a liquid state – (N) is the freezing process.
- c.** (Y) is a liquid state – (Z) is a solid state – (N) is the evaporation process.
- d.** (Y) is a liquid state – (Z) is a gaseous state – (M) is the condensation process.

- 7 The attraction force between the particles is the greatest in figure (.....).



- 8 If you have filter paper, a clean glass sheet and a flame (burner), what is the correct sequence for the processes that occur to the sample in the following figure to obtain a drinkable water?

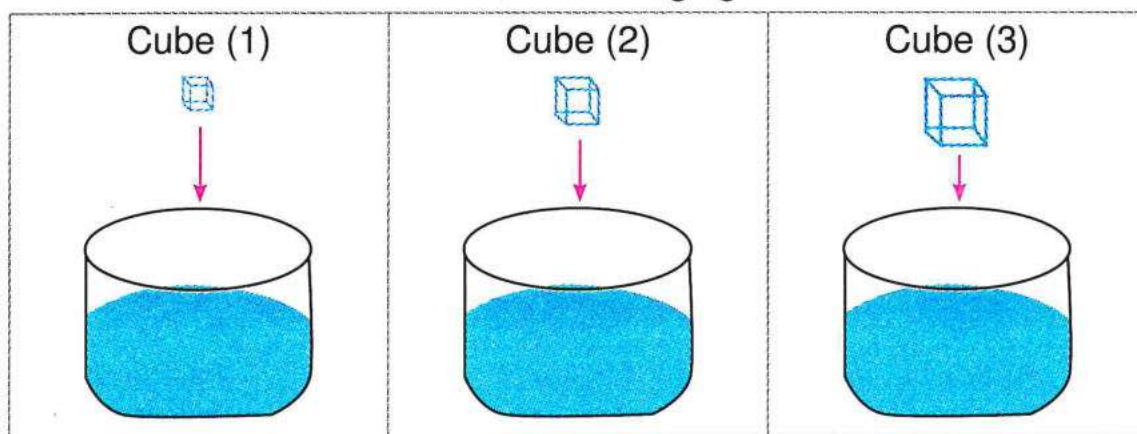
- a. Evaporation – filtration – condensation
- b. Evaporation – condensation – filtration
- c. Filtration – evaporation – condensation
- d. Filtration – condensation – evaporation



- 9 Which of the following is considered an evidence of a chemical change?

- a. Evolving of smoke.
- b. Crushing nuts.
- c. Squeezing a balloon filled with air.
- d. Melting a piece of wax.

- 10 A pupil has three ice cubes with different volumes and three similar containers, and the pupil puts each ice cube in a container containing the same amount of water as in the following figure:



What happens to the ice cubes when they are put in water?

- a. Cubes (1), (2) and (3) sink.
- b. Cubes (1), (2) and (3) float.
- c. Cube (1) floats, and cubes (2) and (3) sink.
- d. Cubes (2) and (1) float, and cube (3) sinks.

PONY Final Exams

Model Exam 1

1 (A) Cross out the odd word:

- Heart – Blood capillaries – Arteries – Veins (.....)

(B) Write the scientific term:

1. It is a measure of how quickly the particles in a matter are moving. (.....)
2. They are the organisms that carry out the decomposition process by breaking down the dead organisms. (.....)
3. It is a copy that is similar to a real thing. (.....)
4. The process of returning a habitat back to its natural state before harm was done. (.....)

2 (A) Put (✓) or (X):

- Grasses and worms can get their energy directly from the sun. ()

(B) Complete the following sentences:

1. The of an amount of oil can be measured by using a scale, while its can be measured by a measuring cup.
2. Cooking pots are made of because it is good conductor of
3. Mud can be separated from water by process.
4. The suitable habitat for microorganisms to survive is water.

3 (A) Choose the correct answer:

- The change that occurs during the rusting of iron is the same change produced from
 (a) cutting a piece of cloth (b) breaking of glass
 (c) making bread (d) melting of ice
- The of plants absorb water and nutrients from the soil.
 (a) roots (b) stems (c) leaves (d) flowers

(B) Give a reason for:

- Hawks depend on plants to get energy.

- The roof of a desert home is made of strong stones.

- Coral bleaching occurs when the seawater temperature rises.

4 (A) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. Oxygen	(a) has a definite shape and no definite volume.
2. Gasoline	(b) takes the shape and volume of a container.
	(c) takes only the shape of a container.

1. 2.

(B) What happens if:

- We put a cup of water in the freezer?

- The climate change is unsuitable for a population of one type of species?

(C) Mention the type of stem and leaves of pine tree.

Model Exam 2

1 (A) Put (✓) or (X):

- Mass is measure of the amount of matter that is measured in grams. ()

(B) What happens to:

1. The motion of water particles if an amount of water is heated?
.....

2. The number of secondary consumers, if the number of primary consumers decreases in a certain ecosystem?
.....

3. The mass and structure of salt when it is mixed with some flour?
.....

4. The shape of a liquid, on transferring it in another container with a different shape?
.....

2 (A) Cross out the odd word:

- Milk – Wood – Oil – Water (.....)

(B) Mention example of each of the following:

1. A gaseous mixture.
.....

2. A decomposer.
.....

(C) Give a reason for:

1. The circulatory system has an important role for human.
.....

2. Salt is a matter.
.....

3 (A) Study the following food chain, then complete the following sentences:



1. can be a prey and a predator in the same time.
2. Energy directly transfers from the to the mouse.

(B) Write the scientific term:

1. It is the matter that is formed when two or more materials combine chemically. (.....)
2. They are the reproductive parts of many plants. (.....)
3. It is the state of matter that has fixed size and shape. (.....)

4 (A) Choose the correct answer:

1. The marine food web usually starts with
 (a) clam (b) zooplankton
 (c) parrotfish (d) algae
2. Plants make their food by a process known as
 (a) respiration (b) absorption
 (c) photosynthesis (d) digestion

(B) Complete each of the following:

1. When ice is melted, it changes from a state to a state.
2. When corals the seawater, they may ingest
3. is used in making hammers because it is

Model Exam 3

1 (A) Choose the correct answer:

- Matter can be found in states.

(a) two (b) three (c) four (d) seven

(B) Complete the following sentences:

1. Food materials are transported from the leaves to the other parts of the plant through vessels.
2. When there is a gentle rain in a desert ecosystem, this ecosystem may
3. A model of a germ helps us see its shape without using a
4. The volume of one liter of water has a of one kilogram.

2 (A) Form a food chain by using the living organism below:

- Coral – Zooplankton – Shark – Algae – Parrotfish
-

(B) Give a reason for:

1. Liquids take the shape of their containers.
-
-

2. Decomposers play an important role in the ecosystem.
-
-

(C) What happens if:

1. Plants' leaves don't contain chlorophyll?
-

2. You put a piece of cork and an iron nail in a basin of water?
-

3 (A) Put (✓) or (X):

1. A food web shows an interaction between few living organisms. ()
2. Iron rusts when it combines with hydrogen. ()

(B) Write one importance for each of the following:

1. Root hairs.

.....

.....

2. Thermometer.

.....

.....

3. Helium.

.....

.....

4 (A) Cross out the odd word:

1. Rabbits – Snakes – Eagles – Hawks (.....)
2. Roots – Leaves – Stems – Veins (.....)

(B) Write the scientific term:

- A community that includes living organisms and non-living things that interact with each other. (.....)

(C) Write the type of the change in each of the following pictures:



Model Exam 4

1 (A) Put (✓) or (X):

- Light and sound are forms of matter. ()

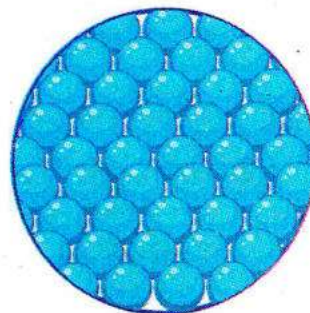
(B) Give a reason for:

1. Plastic is very harmful to marine organisms.

2. Life on Earth without plants would be impossible.

(C) Study the opposite figure, then complete the following sentences:

1. This figure represents the matter in the state which has shape and volume.
2. When this matter is heated, the spaces between its particles, so the matter changes into a state.



2 (A) Form a food chain from the following organisms:

- Frog – Grass – Locust – Snake – Owl

(B) Compare between:

P.O.C	Evaporation process	Condensation process
Definition		

(C) What happens when:

1. Oxygen combines with carbon and hydrogen?

2. We remove the flowers of a plant?

3 (A) Cross out the odd word:

1. Water – Sunlight – Oxygen – Carbon dioxide (.....)
2. Milliliter– Liter – Cubic centimeter – Kilogram (.....)

(B) Write the scientific term:

1. The material that is used to build the roof of cold weather homes. (.....)
2. It is a condition in which coral reefs turn completely into white. (.....)
3. A model that shows a linear set of feeding relationships and energy flow between living organisms. (.....)

4 (A) Choose the correct answer:

1. is the main source of energy for all living organisms.
 (a) Food (b) Plant (c) Water (d) The sun
2. The state of matter changes by changing its
 (a) size (b) mass (c) temperature (d) color

(B) Mention one example of each of the following:

1. A mixture of solid materials.

2. A seed can be dispersed by floating on water.

3. A nonflammable gas.

Model Exam 5

1 (A) Choose the correct answer:

- carry blood rich in oxygen and nutrients from the heart to all the body cells.

(a) Veins (b) Arteries (c) Xylem (d) Phloem

(B) Complete the following sentences:

- During photosynthesis process, the light energy from the sun is converted into energy stored in which is a type of sugar.
- Digestion of food within the body's cells is a change, while melting a piece of butter is a change.
- Wind plays a role in the dispersal of seeds.
- build their nests on the top of mountains' cliffs.

2 (A) Cross out the odd word:

- Iron – Plastic – Cork – Stone

(.....)

(B) Write the scientific term:

- The process of removing salt from salty water.
- The most diverse and variable ecosystems on Earth.

(.....)

(.....)

(C) Mention one importance of each of the following:

- Balance.

.....
.....

- Measuring cup.

.....
.....

3 (A) Put (✓) or (X):

1. If the masses of two different materials are equal, their volumes must be equal. ()
2. Seaweed, shells, and fish can be removed from ocean's water by filtration process. ()

(B) Give a reason for:

1. Particles of gases can spread out quickly to fill up any container they are put in.
.....
.....
2. The atmosphere is considered as a mixture.
.....
.....
3. The roof of a tropical rainforest home is made of leaves and sticks.
.....
.....

4 (A) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. Oxygen	(a) its particles are packed tightly together.
2. Gold	(b) is the gas produced from photosynthesis process.
	(c) is the gas used in photosynthesis process.

1. 2.

(B) What happens to:

1. The particles of water when its temperature is decreased below 0.°C?
.....
2. Microorganisms if the temperature of seawater rises?
.....
3. A wet iron nail is exposed to oxygen of air for a long period of time?
.....

Model Exam 6

1 (A) Cross out the odd word:

- Copper – Iron – Aluminum – Gasoline

(.....)

(B) Give a reason for:

1. Although water vapor is invisible, we can see steam during cooking.

.....

2. Cracking nuts is considered as a physical change.

.....

(C) Write the scientific term:

1. They are pores on the surface of the plants' leaves that allow gases move in and out the plant.

(.....)

2. The building units of matter.

(.....)

2 (A) Form a food chain from the following organisms:

- Seabirds – Microorganisms – Bacteria – Small fish

.....

.....

(B) Compare between:

P.O.C	Producers	Consumers
Definition		

(C) Mention one example of each of the following:

1. A top predator in a marine ecosystem.

.....

2. A plant that has a climb stem.

.....

3 (A) Observe the opposite figures, then put (✓) or (X):

1. The particles in figure ① move slower than the particles in figure ②. ()
2. The particles in figure ② can slide over each other. ()

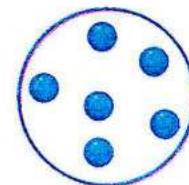


Figure (1)

Figure (2)

(B) What happens if:

1. Plastic products are exposed to sunlight?

.....

.....

2. You add vinegar to baking soda?

.....

.....

(C) What's meant by:

- Melting process?

.....

.....

4 (A) Choose the correct answer:

1. Photosynthesis process take place inside plants'
 (a) leaves (b) stems (c) roots (d) flowers
2. If the amount of grass in an ecosystem increases, this directly causes the increase in the number of
 (a) hawks (b) rabbits (c) caracals (d) lions

(B) Complete the following sentences:

1. The odor of vinegar is one of its properties, while the ability of a paper to be burned is a property.
2. One kilogram = gram(s).
3. Habitat loss is the main cause of of many living organisms.

Model Exam 7

1 (A) Choose the correct answer:

- Particles of have large spaces and large amount of energy.

(a) gold

(b) water

(c) iron

(d) helium

(B) Complete the following sentences:

1. anchor the plant in the soil.
2. seeds and maple seeds travel by

(C) Complete the following diagram:



2 (A) Cross out the odd word:

- Fungi – Millipedes – Algae – Worms

(.....)

(B) Write the scientific term:

1. The interaction among many food chains.
2. The tool used to measure the length of a wall.

(.....)

(.....)

(C) Mention the suitable materials used to make the following items:



3 (A) Put (✓) or (X):

1. Squeezing a balloon filled with air is considered as a chemical change. ()
2. Desalination is the process of removing salt from water by cooling only. ()

(B) Give a reason for:

1. Rabbits are considered as primary consumers.

.....

.....

2. Xylem is considered as a one-way vessel.

.....

.....

3. Making bread is considered as a chemical change.

.....

.....

4 (A) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. Sea urchin	Ⓐ is a top predator in a desert food web.
2. Eagle	Ⓑ feed on corals in a marine food web.
	Ⓒ is a primary consumer in a marine food web.

1. 2.

(B) What happens to:

1. The volume and shape of a coin when it is placed in a glass cup?

.....

.....

2. The temperature of matter, if the speed of its particles decreases?

.....

.....

3. Primary consumers, if all grass disappear from a certain ecosystem?

.....

.....

Model Exam 8

1 (A) Cross out the odd word:

- Burning of sugar – Making cake – Melting of wax – Rusting of iron

(.....)

(B) Give a reason for:

- Food is very important for human.

.....

- Burdock seeds can be dispersed by sticking to animals' fur or humans' clothes.

.....

(C) Write the scientific term:

- It is anything that has a mass and takes up space. (.....)

- An area in the sea where scientists take care of small pieces of coral until they grow up. (.....)

2 (A) Form a food chain from the following organisms:

- Starfish – Clam – Shark – Algae

.....

(B) Compare between:

P.O.C	Solid state	Gas state
Motion of particles		
Arrangement of particles		

3 (A) Choose the correct answer:

1. can live on decaying the bodies of dead organisms.
 (a) Decomposers (b) Consumers (c) Predators (d) Producers
2. can be used to measure the length of a pencil.
 (a) Measuring cup (b) Ruler
 (c) Scale (d) Thermometer

(B) Complete the following sentences:

1. consumers are called herbivores.
2. isn't from the basic needs for the plant during its initial growth.
3. Matter consists of tiny moving
4. The small vessels that connect arteries to veins are called

4 (A) Correct the underlined words:

1. Coral bleaching happens when the temperature of seawater decreases.
 (.....)
2. Most flowers have wood stems.
 (.....)

(B) What happens to:

1. The volume of a balloon if you blow it up?

.....

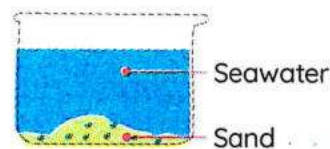
.....

2. A hawk that lives in an ecosystem that contains plants only?

.....

.....

- (C) How can you separate sand only from the mixture in the opposite picture, with giving a reason for your reason?**



.....

.....

.....

Model Exam 9

1 (A) Choose the correct answer:

- Oil takes the of its container.

(a) volume (b) mass (c) color (d) shape

(B) Complete the following sentences:

- Salt can be separated from salt solution by process.
- Potato has a stem extends underground.
- carry blood rich in carbon dioxide from all body parts to the
- The model of the helps us to see all planets at once, while is a model that allows us to see the shape of Earth.

2 (A) Classify the following organisms into producers and consumers:

- Seabirds.

.....

- Grasses.

.....

(B) Give a reason for:

- Balloons and blimps are filled with helium.

.....

- Human can't drink the water of seas and oceans.

.....

- Electric wires are made of copper.

.....

(C) Mention one importance of each of the following:

- Electron microscope.

.....

.....

3 (A) Correct the underlined words:

1. When adding oil to baking soda, a new compound is formed. (.....)
2. Sea turtle can't differentiate between algae and a piece of plastic.
(.....)

(B) What happens if:

1. Decomposers disappear from a certain ecosystem?

.....
.....

2. A piece of paper is burned?

.....
.....

3. Iodine is added to cornstarch?

.....
.....

4 (A) Cross out the odd word:

1. Insects – Snakes – Eagles – Owls (.....)
2. Boiling water – Melting chocolate – Frying an egg – Cutting vegetables
(.....)

(B) Write the scientific term:

1. It is the process which matter changes from a liquid state to a solid state.
(.....)
2. They are small plastic pieces that are smaller than a grain of rice.
(.....)
3. A transparent material used in making eyeglasses and light bulbs.
(.....)

Model Exam 10

1 (A) Cross out the odd word:

- Clam – Zooplankton – Algae – Sea urchin

(.....)

(B) Give a reason for:

1. Formation of water droplets when water vapor touches a cold surface.

.....

2. The handles of cooking pots are made of plastic or wood.

.....

3. When the temperature of ice cubes increases, they melt.

.....

4. Human can use helium safely.

.....

2 (A) Choose the correct answer:

- Particles of vibrate around their place.

(a) iron

(b) air

(c) oxygen

(d) water

(B) Complete the following sentences:

1. Sunlight energy allows and gas to combine inside plants' leaves to make plant's food.

2. The consumers that exist at the top of food chains are called

3. The changes in matter which are usually reversible and don't affect its structure are called changes.

4. The process of producing a new plant is known as

3 (A) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1. Prey	Ⓐ is a human activity that decrease the population of marine organisms.
2. Overfishing	Ⓑ is a consumer that is eaten by another animal.
	Ⓒ is an animal that hunts another animal.

1. 2.

(B) Write the scientific term:

- The process in which a plant seed begins to grow and makes sprouts. (.....)
- A device used to examine one tiny particle as one blood cell. (.....)
- The gas consumed by producers to make their own food. (.....)

4 (A) Put (✓) or (X):

- A model of an airplane shows us how it flies up into the air. ()
- Both liquids and gases take the shape of the container they are placed in. ()

(B) What happens if:

- You put a magnet near an iron nail and a stone?
.....
- You boiled an amount of water? (According to the change in the state)
.....

(C) Write below the seeds in each picture their way of dispersal:



Government Exams

Model 1 Cairo – New Cairo Directorate

1 (A) Put (✓) or (x) on the following statement:

1. Roots absorb water and nutrients from the soil. ()
2. The food chain begins with consumers. ()
3. The number of living organisms decreases if climatic conditions are not suitable. ()

(B) What is importance of a measuring cup?

.....

.....

.....

2 (A) Complete the following sentence:

- The gas is important to make photosynthesis process.

(B) Write the scientific term:

1. Changing of matter from solid state to liquid state. (.....)
2. The path of energy flow from one organism to another. (.....)

3 (A) Choose the correct answer:

- Glucose sugar is transported within the plant through vessels.
(a) xylem (b) phloem (c) veins (d) arteries

(B) Give a reason for:

1. Copper is used to make electric wires.

.....

.....

2. The occurrence of coral bleaching.

.....

.....

Model 2 Giza – 6th October Directorate

1 (A) Cross the odd word:

- Eagle – Hawk – Lion – Rabbit

(.....)

(B) Give a reason for:

1. Oil is a matter.

.....
.....

2. Sunlight is very important for all living organisms.

.....
.....

2 (A) Correct the underlined word:

- Veins carry blood rich in oxygen and nutrients to all body cells. (.....)

(B) What happen if:

1. You heat some ice cubes?

.....
.....

2. The plant is placed in a dark place for many days?

.....
.....

3 (A) Choose the correct answer:

1. Any food chain starts with

(a) insects (b) plants (c) bacteria (d) fungi

2. seeds stick to animal fur.

(a) Maple (b) Burdock (c) Tomato (d) Coconut

3. The of plant get(s) water and nutrients from the soil.

(a) root (b) stem (c) leaves (d) flower

(B) Give one example:

- A gas that is used in filling balloons.

(.....)

Model 3 Qalyubia – Banha Directorate

1 (A) Choose the correct answer:

- The plant makes through the process of photosynthesis.
 (a) sugar (b) nitrogen (c) seeds (d) carbon dioxide
- According to the way of feeding, living organisms are classified into groups.
 (a) two (b) three (c) four (d) five
- Algae are found in the of the marine food chain.
 (a) beginning (b) middle (c) end (d) right

(B) Write the scientific term:

- The state of matter in which particles have a lot of spaces. (.....)

2 (A) Correct underlined word:

- The potato plants have climb stem that extends underground. (.....)

(B) Give a reason for:

- Bacteria are considered decomposers.
-

(C) What happen if:

- A paper interacts (is burnt) with fire?
-

3 (A) Put (✓) or (x) on the following statement:

- Coral bleaching happen when the temperature of water rises in the oceans. ()

(B) Mention of the following:

- The way of seed dispersal for burdock seeds.
-

- One use of helium.
-

Model 4 Alexandria – East Directorate

1 (A) Choose the correct answer:

- The living organisms that can make its own food is called
organisms.
 (a) producers (b) consumers (c) decomposers (d) animals
- One of the plant root functions is
 (a) produce food (b) absorbing (c) reproduction (d) breathing
- Both apple and tomato seeds are dispersed by
 (a) wind (b) eaten by animal
 (c) water (d) fur

(B) Mention one use:

- Measuring cup.

2 (A) Complete the followings:

- The microorganisms are considered in the aquatic food chain.

(B) Give a reason for:

- Sea turtle eats a lot of plastic materials.
- Iron has definite volume and doesn't take the shape of its container.

3 (A) Put (✓) or (X) on the following statement:

- Phloem transports water and salts from the plant root to the stem. ()

(B) What happen when:

- The plant can't absorbs carbon dioxide from air?
- Putting a piece of wood and coin in water?

Model 5 Dakahlia – Educational Directorate

1 (A) Choose the correct Answer:

- In plants leaves, light energy of the sun change into energy.
 (a) sound (b) electric (c) chemical (d) kinetic
- Lion is from.....
 (a) producers (b) grass eaters (c) meat eaters (d) decomposers
- carry blood that is rich in oxygen from the heart to the body cells.
 (a) Cells (b) Veins (c) Arteries (d) Lungs and Veins

(B) Give a reason for:

- Rusting of iron is considered a chemical property of matter.
- Copper is used in making electric wires.

2 (A) Correct the underlined word:

- In photosynthesis green plant uses their leaves to collect oxygen gas from air.
 (.....)

(B) Answer the following:

- Create a food chain from the following organisms:
 Rabbit – Carrot – Snake – Bacteria – Hawk
- Compare between mixture and compound.
- What do plants need to live and grow?
- Give one importance of coral reefs.

3 (A) Write the scientific term:

- They are narrow holes spread on the surface plant's leaves that allow gases to move into and out of the plant.
 (.....)

(B) Answer the following:

- Classify the following organisms into producer and consumers:
 Snake – Green plant – Bacteria – Algae – Trees – Rabbit
- Complete the table:
 - If there is a heavy rain in the desert, the desert ecosystem might because
- Compare between solid state and gaseous state according to their shape and volume.
- Give two examples for Physical change.

Model 6 Damietta – Educational Directorate

1 (A) Choose the correct Answer:

- All the following structures exist in green plants, except
 (a) stems (b) fruits (c) blood (d) leaves
- The in a plant support the plant and are responsible for the transmission of nutrients. inside the plant.
 (a) Leaves (b) stem (c) roots (d) flowers
- The human circulatory system includes all the following structures, except
 (a) heart (b) vein (c) artery (d) lungs
- When a rabbit dies in the desert, its body
 (a) Grows (b) stays (c) freezes (d) decomposes

(B) What happens if:

- A plant isn't exposed to sunlight for a few days?

2 (A) Put (✓) or (x) on the following statements:

- Xylem allows nutrients to move upward inside the plant. ()
- Veins carry the blood rich in oxygen from the heart to all the body cells. ()
- Glucose is produced in plants by the digestion process. ()
- Tundra deserts have nonliving things only. ()

3 (A) Classify the following words in these tables:

- Xylem – Veins – Phloem – Artery – Roots – Heart

Human circulatory system	plant transport system

(B) Cross out the odd word:

- Goats – Rabbits – Caracals – Cows ()
- Foxes – Lions – Bull sharks – Rabbits ()

Model 7 Menoufia – Ashmoon Directorate

1 (A) Complete the following:

1. The stems that grow horizontally on the surface of the soil and help in the formation of new plants are stems.
2. Energy is transferred from to plants directly in the food web.
3. Coral reefs lose their colors when the which they live in it migrate.
4. The transport water and nutrients from the soil to the leaf while carrying blood from all parts of the body to the heart.

(B) Give a reason for:

- Cooking utensil handles are made of plastic.
-

2 (A) Choose the correct answer:

- Deer that eats grass are consumers that are located at level in the food chain.
- (a) first (b) second (c) third (d) last

(B) What happens:

1. When a piece of ice is placed in the sun for long period of time?
.....
2. If the roots disappeared from the plants?
.....

3 (A) Put (✓) or (x) on the following statements:

1. The xylem vessels in the roots connect the stem to the leaves. ()
2. Water, air and plants are considered non-living elements in the ecosystem. ()

(B) Mention of the following:

1. The type of mixture in fruit salad.
.....
2. Method of spreading light seeds.
.....
3. One example of plants with tuber stems that grow under the ground.
.....

Model 8 Menoufia – Shebin El-Kom Directorate

1 (A) Put (✓) or (x) on the following statements:

1. The process of photosynthesis occurs in the roots of the plant. ()
2. Light seeds are dispersed by the wind. ()
3. The food chain starts with a consumer. ()

(B) What happens when:

- Iron reacts with atmospheric oxygen?

.....

.....

2 (A) Complete with a suitable word from what is between brackets:

- Plant leaves contain that allow air to enter through there.
(stomata – vessels)

(B) Give a reason for:

1. Sound and light are not matter.

.....

2. The presence of root hairs in the root of the plant.

.....

3 (A) Choose the correct answer from between brackets:

- Living organisms and non-living elements are components of
(food chain – ecosystem – photosynthesis process – food web)

(B) Compare between the following in the table:

1. Burning paper and cutting paper in terms of the type of change.

.....

.....

2. Bacteria and algae in terms of the way of feeding in the food chain.

.....

.....

Model 2 Port Said – Port Fouad Directorate

1 (A) Complete the following sentences:

1. Sound is considered a form of
2. We use to measure temperature.

(B) What happens if:

- The green plant is placed in a dark place for a week?

.....

2 (A) Choose the correct answer:

1. The process of photosynthesis occurs in
 (a) stem (b) flowers (c) leaves (d) roots
2. The heart consists of chambers.
 (a) three (b) four (c) five (d) two
3. We use the unit to measure the mass of the body.
 (a) liter (b) kilogram (c) meter (d) centimeter

(B) Give a reason for:

- Trees are considered as producers.

.....

3 (A) Put (✓) or (X) on the following statement:

- Blood moves in the arteries and veins in two directions. ()

(B) Write what the following statement means:

1. it consists of living organisms and non-living things. (.....)
2. The state of water after freezing. (.....)

Model 10 Kafr El-Sheikh – Educational Directorate

1 (A) Choose the correct answer:

- Half liter of water equals the mass of it.
 (a) 500kg (b) 500 grams (c) 1000 grams (d) 1 kg
- is not considered as a primary consumer in a marine food web.
 (a) Calm (b) Sea urchin (c) Zooplankton (d) Sea star
- All the following matter doesn't have a definite shape, except
 (a) helium (b) oxygen (c) iron (d) water

(B) Give a reason for:

- Handles of cooking pots are made of plastic.
-
-

2 (A) Put (✓) or (X) on the following statement:

- Arteries carry blood rich in oxygen and glucose sugar from all body cells to the heart. ()

(B) Write the scientific term:

- The organisms that return nutrients of dead organisms back to the soil. (.....)
- The gas released from plants through photosynthesis process. (.....)

3 (A) Cross out the odd word:

- Rusting of iron – Melting of wax – Cracking nuts – Cutting paper (.....)

(B) Complete the following sentences:

- When liquid matter is cooled, its particles' speed
- The occurs when the color of coral reefs turns completely into white.



PONY

2026

Science

Model Answer

5 Primary
First Term
By Ahmed Omara



Check Your Understanding?

Concept 1.1 – Plant Needs

Activity	Page	Answers
2	13	Water – Air – Sunlight
3	14	Basic Plant Needs for Photosynthesis: Carbon dioxide – Water – Sunlight Not basic Plant Needs for Photosynthesis: Sugar – Oxygen – Soil
4	20	1 X 2 X
5	22	1 ✓ 2 ✓
6	32	1 ✓ 2 ✓
7	34	1 X 2 ✓ 3 ✓ 4 X
8	44	1 X 2 ✓
9	45	① light – sun – water – carbon dioxide – starch – fats – Oxygen ② 1 chlorophyll 2 xylem 3 stomata ③ a. 3 b. 4 c. 2 d. 1
10	47	1 leaves 2 Plant reproduction 3 flowers 4 dark
11	56	1 X 2 ✓

Concept 1.2 – Energy Flow in Ecosystem

Activity	Page	Answers
1	65	1 ✓ 2 ✓ 3 X 4 ✓
2	66	1 ✓ 2 ✓

3	67	1 X 2 ✓
4	73	1 X 2 X 3 ✓ 4 X
5	77	Grass → Mice → Snakes → Hawks.
6	79	1 ✓ 2 X
7	87	① 1 X 2 X ② (A) Grass → Grasshopper → Bird → Snake (B) 1 predator 2 prey 3 predator and prey 4 producer
8	88	1 three 2 grasshopper – snake 3 frog
9	89	1 ✓ 2 X
11	95	1 X 2 X

Concept 1.3 – Changes in Food Webs

Activity	Page	Answers
2	102	1 X 2 X
4	112	1 X 2 X
5	113	1 eagle – fox 2 grass 3 eagle – mouse 4 rabbit – mouse
6	116	1 ✓ 2 ✓
7	123	1 X 2 X
8	125	1 X 2 ✓
10	133	1 X 2 ✓

Concept 2.1 – Matter in the World Around Us

Activity	Page	Answers
2	142	Solids: Sand – Wood – Iron – Gold – Plastic – Glass – Sugar Liquids: Juice – Oil – Water – Gasoline – Vinegar Gases: Steam – Oxygen – Carbon dioxide – Air
3	147	1 ✓ 2 X 3 X
4	151	1 Liquids 2 Solids 3 Gases 4 melting 5 freezing 6 particles - motion.
5	158	1 ✓ 2 X
7	161	1 X 2 ✓
8	168	1 X 2 ✓
9	169	1 X 2 ✓
11	174	1 ✓ 2 X

Concept 2.2 – Describing and Measuring Matter

Activity	Page	Answers
2	182	1 ✓ 2 X
3	183	1 balance 2 Volume
4	189	1 X 2 X
5	194	1 ✓ 2 X 3 X 4 ✓
6	197	1 X 2 X 3 X 4 X
7	198	1 volume 2 mass 3 floats on 4 Iron
8	205	1 X 2 X
9	206	1 Windows 2 Car tires 3 Electric wires 4 Hammers

Concept 2.3 – Comparing Changes in Matter

Activity	Page	Answers	
1	215	1 X	2 ✓
2	216	1 slowly 3 increase	2 quickly
3	218	1 X 3 ✓	2 X 4 ✓
4	223	5 X	6 ✓
5	226	1 ✓ 3 X	2 X 4 ✓
6	235	1 ✓	2 X
7	238	10	
8	245	1 ✓	2 X
9	247	1 Chemical. 3 Chemical. 4 Physical. 6 Physical.	2 Chemical. 5 Chemical.
10	249	Change	Evidence
		1 Chemical.	Formation of new matter (iron oxide).
		2 Physical.	The shape of gold changes only.
		3 Physical.	The shape of sand changes only.
		4 Chemical.	Formation of new matter (ash).
		5 Physical.	The state of butter changes only.
		6 Chemical.	Formation of new matter (bread).
12	258	1 X	2 X

Main Book Answers

Unit 1

Concept 1.1

Lesson 1

- 1 c 2 c 3 c 4 b
5 b 6 d 7 c 8 d
9 d 10 b

2

Number	Correction
1 ✓	
2 X	 photosynthesis
3 ✓	4 ✓
5 X	 water, air and sunlight
6 ✓	
7 X	 from the roots to the plant's leaves
8 X	 in the plant's leaves.
9 ✓	10 ✓ 11 ✓

- 3 1 Roots 2 stem
3 leaves 4 nutrients

- 4 1 Photosynthesis process.
2 Stem. 3 Root.
4 Leaf. 5 The sun.
6 Carbon dioxide gas.

- 5 1 Roots, stem – leaves
2 photosynthesis 3 nutrients – roots
4 energy 5 water
6 carbon dioxide 7 roots – leaves

- 6 1 Sunlight. (Because the rest are the main parts of the plant.)
2 Oxygen. (Because the rest are from the basic needs for the plant to make photosynthesis process.)

- 7 1 b 2 d 3 a 4 c

8

Basic plant's needs to make its own food.

Carbon dioxide gas
Sunlight
Water

Not basic plant's needs to make its own food.

Oxygen gas
Sugar

- 9 1 c 2 b 3 b

- 10 1 Because food provides the humans with the needed nutrients and energy to grow and survive.
2 Because the plants make their own food (glucose sugar) through photosynthesis process.

- 11 1 The plant can't make its own food through photosynthesis process, so it can't survive.
2 The plant can't make its own food through photosynthesis process, so it can't survive.

Concept 1.1

Lesson 2

- 1 1 c 2 d 3 d 4 d
5 d 6 c 7 b

2

Number	Correction
1 X	Plants can't
2 X	 carbon dioxide gas
3 ✓	
4 X	 the absence of soil only.
5 X	 at a slower rate
6 X	 water and sunlight
7 X	At daytime, plants use sunlight
8 ✓	

- 3 1 wet 2 soil
3 Carbon dioxide 4 Oxygen
5 leaves

- 4 1 Photosynthesis process.
2 Oxygen gas.
3 Germination process.

- 5 1 sunlight – soil 2 sugar – oxygen gas
3 soil
4 carbon dioxide – oxygen
5 leaves
6 Glucose sugar – photosynthesis
7 pale green (yellow) 8 water – roots

- 6 1 B, slower – A 2 germinates

- 7 1 Because plants' leaves absorb sunlight and carbon dioxide gas from the air and they allow it to combine with water during photosynthesis process to make plant's food.
2 Because plants use the sunlight to make their own food during photosynthesis process.

- 8 1 The seed germinates forming a new plant.
2 The plant can't make photosynthesis process, so it dies.

Concept 1.1

Lesson 3

- 1 1 c 2 b 3 a 4 c
5 b 6 c 7 d 8 c
9 b 10 d 11 d

2

Number	Correction
1 ✓	
2 X	Phloem carries
3 ✓	4 ✓

5 X	 underground the soil
6 X	 have upright stems.
7 ✓	8 ✓ 9 ✓
10 X	Chlorophyll in plant's leaves
11 ✓	
12 X	 in the plant's leaves
13 ✓	

- 3 1 leaves 2 Roots
3 tuber 4 roots
5 air (carbon dioxide) 6 increase
7 Pine 8 green

- 4 1 Root. 2 Root hairs.
3 Xylem. 4 Runner stem.
5 Tuber stem. 6 Pine tree.
7 Stomata. 8 Chlorophyll.
9 Phloem. 10 Leaves.
11 Oxygen gas.

- 5 1 upright 2 stomata
3 chlorophyll 4 oxygen gas
5 phloem 6 stomata
7 leaves

- 6 1 Carbon dioxide gas. (Because the rest are products of photosynthesis process.)
2 Sugar. (Because the rest are basic needs in photosynthesis process)

- 7 1 c 2 b 3 e 4 a
5 d

- 8 1 Vine. 2 Potato. 3 Pine

- 9 • Revision Book p. 4 & 5.

- 10 • Revision Book p. 4.

- 11 • Nutrients such as sugar, starch, fats, and proteins.

12 1 Red 2 Xylem

13 1 upright 2 climb
3 tuber 4 runner

- 14 1 Because they transport water and nutrients from the plant's roots to its leaves.
2 Because chlorophyll absorbs sunlight to allow water and carbon dioxide to combine during photosynthesis process.
3 Because during photosynthesis process plants produce oxygen gas that humans and animals need to breathe.
4 Because root hairs increase the amount of water that the plant take in from the soil.

- 15 1 The plant's leaves can't absorb sunlight needed for photosynthesis process.
2 Gases can't move into and out of the plant's leaves.
3 The plant can't make its own food because it can't make photosynthesis process.

Concept 11

Lesson 4

1 1 c 2 d 3 d 4 c
5 b 6 c 7 d 8 c
9 d 10 c 11 a 12 c
13 b

2

Number	Correction
1 ✓	2 ✓
3 ✓	4 ✓
5 x	 through nose or mouth.
6 x	The arteries
7 ✓	
8 x	Veins carry
9 ✓	10 ✓

11 x	 through photosynthesis process.
12 ✓	
13 x	 upward in the plant.
14 x	Some plants
15 ✓	

3 1 carbon dioxide 2 atria
3 blood 4 leaves
5 flower 6 seeds

4 1 Human circulatory system.
2 The heart. 3 Arteries.
4 Veins. 5 Xylem.
6 Phloem.
7 Plant's transport system (Vascular system)
8 Flowers. 9 Flower.

5 1 Veins. (Because the rest are parts of the plant.)
2 Phloem. (Because the rest are parts of the human circulatory system.)
3 Blood. (Because the rest are parts of the plant.)

6 1 oxygen – nutrients (glucose)
2 circulatory 3 transport (vascular)
4 Veins 5 Flowers
6 nose – mouth 7 arteries – veins
8 Arteries 9 blood capillaries
10 carbon dioxide – heart
11 Xylem – roots – leaves
12 light – chemical 13 reproductive
14 seeds

7 1 Three. 2 Four.
3 Two.

8 1 b 2 d 3 a 4 e
5 c

9

Human Circulatory System	Plant Transport System
Veins	Xylem
Blood capillaries	Phloem
Arteries	
Heart	

- 10 1 Artery. (Vein) 2 Xylem. (Phloem)

- 11 • Revision Book p. 4, 5 & 6.

- 12 1 c 2 b 3 c

- 13 1 x 2 x 3 x 4 ✓
5 ✓

- 14 1 Because the circulatory system transports oxygen and nutrients through the blood to all the body cells.
2 Because both carry different materials in one direction.
3 Because flowers produce seeds that help the plant to reproduce.

- 15 1 The food materials produced inside leaves during photosynthesis process can't be transported to other parts of the plant.
2 The plant can't reproduce.

Concept 1.1

Lesson 5

- 1 1 d 2 a 3 b 4 d
5 b 6 b

2

Number	Correction
1 x	 by wind, water and animals.
2 x	 by water.

3 ✓

4 x because they can float on water.

5 x by wind.

6 ✓

7 x Maple seeds are light

8 ✓

9 x Maple seeds are light,

- 3 1 dispersal 2 spiny
3 float on 4 water

- 4 1 Seed dispersal. 2 Coconut seeds.

- 5 1 water 2 seed dispersal
3 coconut – maple (dandelion)
4 stool – apple (tomato)

- 6 • By floating on water. • By wind.

- 7 1 By wind. 2 By floating on water.

- 8 1 stool 2 (1) – water
3 (4) – wind 4 (2)

- 9 1 Because seeds are dispersed from one place to another by wind or animals.
2 Because they are light seeds.
3 Because seeds that have spines such as burdock seeds can stick to human's clothes.
4 Because burdock seeds have spines.

- 10 1 The seeds can't be dispersed by wind.
2 They can't stick to animals' fur or human's clothes, so they can't be dispersed.

Concept 1.2

Lesson 1

- 1 1 b 2 c 3 b 4 c
5 b 6 d 7 b 8 d
9 c

2

Number	Correction
1 x	 living organisms and nonliving things.
2 x	There's an interaction between
3 ✓	4 ✓ 5 ✓
6 x	 snakes, squirrel and mice.
7 x	 transfers from the grass to the rabbit.
8 ✓	9 ✓

3 1 Ecosystem. 2 Ecosystem.

4 1 living organisms – nonliving things
2 sun 3 animals – plants
4 soil

5 • Rabbit. (Because the rest of words are meat-eater animals.)

6 1 x 2 x 3 ✓ 4 ✓

7 • Because hawks get their needed energy by eating animals that eat plants.

8 • The hawk can't get its needed energy, so it may die or move to another ecosystem.

Concept 1.2**Lesson 2**

1 1 d 2 c 3 c 4 b
5 d 6 b 7 c 8 b
9 b 10 c 11 b 12 c
13 c 14 d 15 d 16 c
17 d 18 c 19 c 20 c
21 d

2

Number	Correction
1 x	Breathing requires energy.
2 ✓	3 ✓ 4 ✓ 5 ✓
6 x	Producers use
7 x	 start with producers.
8 ✓	
9 x	 producers.
10 ✓	
11 x	 that producers use

3 1 sunlight 2 primary
3 three 4 a prey4 1 The sun. 2 Food chain.
3 Tertiary consumers.
4 Oxygen gas. 5 Carbon dioxide gas.
6 Decomposers. 7 Decomposers.5 1 primary consumers
2 nutrients – soil fertility
3 feeding – consumers – decomposers
4 glucose sugar – energy
5 Decomposers 6 Primary consumers

6 1 d 2 a 3 c 4 b

7 1 Grass. (Because the rest are consumers.)
2 Insects. (Because the rest are producers.)
3 Birds. (Because the rest are decomposers.)
4 Worms. (Because the rest are consumers.)8 1 Grass → Mice → Snake → Hawk
→ Bacteria
2 Grass → Rabbit → Snake → Hawk
3 Grass → Duck → Fox

9

Producers	Consumers	Decomposers
Green plants Trees	Snakes Rabbits	Bacteria Fungi

- 10 1 food chain 2 eagle – mouse
3 grass – photosynthesis
4 Fungi

- 11 1 c 2 b 3 c 4 b
5 b

- 12 1 Because the sun is the main source of energy for all living organisms on Earth.
2 Because they can make their own food through photosynthesis process.
3 Because hawks eat animals that eat plants.
4 Because decomposers recycle the nutrients back to the ecosystem by decomposing the dead organisms.
5 Because they can't make their own food.

- 13 1 Producers can't make photosynthesis process, so all living organisms on Earth die.
2 The secondary consumers move to another ecosystem, or they die.
3 Nutrients in dead organisms can't be recycled back to the ecosystem, so the soil fertility decreases.

Concept 1.2

Lesson 3

- 1 1 b 2 c 3 c 4 c
5 b 6 b 7 c 8 c
9 d

2

Number	Correction
1 x	A hawk can't get

2 ✓	3 ✓
4 x	A food web is food chains.
5 x	A food chain
6 ✓	
7 x	Primary consumers get

- 3 1 Energy. 2 Food web.

- 4 1 primary consumers 2 predator – prey
3 grass

- 5 1 Grass → Locust → Frog → Snake → Owl.
2 Grass → Grasshopper → Frog → Snake → Hawk.
3 Grass → Insect → Frog → Snake → Hawk.

- 6 1 b 2 b 3 c 4 c
5 a

- 7 1 E 2 secondary 3 B

- 8 • Because food web shows many food relationships among many living organisms in an ecosystem.

Concept 1.2

Lesson 4

- 1 1 b 2 d 3 c 4 a
5 d

2

Number	Correction
1 ✓	
2 x	 in natural areas.
3 x	 by different ways.
4 ✓	

- 3 1 Natural areas. 2 Restoration ecology.

- 4 • Because these seeds have spines that stick to human's clothes or animals' fur to be carried to another environment.

Concept 1.3

Lesson 1

- 1 1 c 2 a 3 a 4 c
5 b 6 b 7 c 8 c
9 d 10 c 11 b 12 c
13 c 14 c

2

Number	Correction
1 x	Human activities affect
2 ✓	
3 x	 in a marine ecosystem.
4 ✓	
5 x	Water pollution affects
6 ✓	
7 x	 all living organisms may die.
8 ✓	
9 x	 negatively affects
10 x	A food chain in the marine
11 x	Sharks
12 ✓	
13 x	Algae
14 x	The number of parrotfish decreases
15 x	The algae

- 3 1 flood 2 gentle 3 secondary
4 marine 5 algae
6 marine 7 an imbalance

- 4 1 Water pollution. 2 Algae.
3 Top predators. 4 Overfishing.

- 5 1 conservation programs
2 pollution 3 an imbalance
4 decreases 5 grasses
6 decomposers

- 6 1 Sea star. (Because the rest are primary consumers.)
2 Algae. (Because the rest are primary consumers.)
3 Rabbits. (Because the rest are top predators.)
4 Algae. (Because the rest are consumers.)

- 7 1 Producers. 2 Consumers.

- 8 • Algae → Zooplankton → Coral
→ Parrotfish → Shark

- 9 (A) 1 tertiary 2 zooplankton
(B) 1 grasses 2 owls
3 grasses – owls

- 10 1 food web 2 Algae
3 primary 4 increase
5 shark

- 11 1 Because the amount of food resources (grasses) decrease until they disappear.
2 Because algae can make their own food by photosynthesis process.

- 12 1 The food resources decrease and may disappear.
2 The sharks move to another ecosystem or they die.
3 The grass amount decreases.

- 13 1 Overfishing and throwing waste materials in seawater.

- 2 Heavy rain harms the ecosystem, while gentle rain improves the ecosystem.
- 3 Increasing the number of one species lead to decreasing or disappearing of food resources in an ecosystem.
- 4 People in Palau control human activities by:
 - Avoiding throwing waste materials into the ocean to protect marine environment from pollution.
 - Preventing fishermen from overfishing in coral reefs areas.
- 5 a. Grasses. b. Algae.
c. Shark. d. Overfishing.

Concept 1.3

Lesson 2

- 1 1 b 2 d 3 d 4 a
5 b 6 c 7 c 8 d
9 b

2

Number	Correction
1 x	 is recycled into the ecosystem back by the decomposers.
2 ✓	3 ✓
4 x	 need cold water to survive.
5 x	Predators on preys.
6 ✓	7 ✓
8 x	Seabirds feed directly on small fish.
9 x	Microorganisms can't
10 x	If the temperature of sea water increases

- 3 1 Population. 2 Population change.
3 Decomposers. 4 Microorganisms.

- 4 1 cold 2 Microorganisms
3 Seabirds 4 Energy
5 increase

- 5 (A) Microorganisms → Small fish

→ Seabirds → Bacteria.

- (B) 1 c 2 b 3 a

- 6 1 x 2 ✓ 3 ✓ 4 ✓
5 x 6 x

- 7 1 Because microorganisms are the producers in the marine ecosystem as they can make their own food by photosynthesis process.
2 Because seabirds feed on small fish that feed on microorganisms that live in cold water habitat.

- 8 1 The population of this species decreases.
2 Microorganisms move to another cooler place.

- 9 1 Rabbits will die first, eagles will not be affected at the first, then they will die.
2 When the climate change is suitable the population of a species increases, while when the climate change is unsuitable, the population of species decreases.
3 The suitable habitat for microorganisms is the cold water, we can't see microorganisms by the naked eye because they are tiny organisms.
4 Seabirds build their nests on the top of mountains cliffs, and they dive deep down into the sea to feed on small fish.

Concept 1.3

Lesson 3

- 1 1 c 2 b 3 c 4 b
5 d 6 c 7 b 8 b

2

Number	Correction
1 ✓	2 ✓
5 ✓	6 ✓
7 x	 due to rising the water temperature.
8 x	 has a negative impact
9 ✓	10 ✓
11 x	 have a negative effect
12 ✓	

- 3 1 increases 2 white
3 marine 4 more

- 4 1 Extinction. 2 Coral reefs.
3 Coral bleaching. 4 Microplastics.

- 5 1 Sea turtle – plastic 2 extinction
3 overfishing 4 toxic
5 microplastics – filter

- 6 1 b 2 c 3 d 4 a

- 7 1 Because plastics are sharp and toxic.
2 Because corals get rid of algae living in their tissues when the seawater temperature rises.
3 Because it causes the extinction of many marine organisms.

- 8 • Coral reefs is bleached and turns into white as they get rid of algae living in their tissues.

- 9 1 Overfishing and throwing waste materials in water of oceans and seas.
2 Coral reefs provide many marine organisms with food and shelter.
3 Sea turtle eats a lot of plastic pieces thinking they are jellyfish.

- 4 Reducing the usage of plastics and recycling plastic waste instead of throwing them into the water.

Concept 1.3

Lesson 4

- 1 1 c 2 b 3 c 4 b

2

Number	Correction
1 ✓	2 ✓
3 x	Keeping habitats healthy is better than applying restoration projects.
4 ✓	
5 x	We must reduce the use of one-use plastic products

- 3 1 Habitat restoration. 2 Nursery.
3 "Zero plastics" project.

- 4 1 reefs – reproducing 2 100%
3 restoration – reducing – pollution.

- 5 1 Because it repairs all parts of the habitat by restoring water and food resources and prevent species from extinction.
2 Because scientists take care of corals in nursery until they grow up healthy.

- 6 • Many species in this habitat may be lost.

- 7 1 They repair all parts of the habitat by restoring habitat resources and prevent species from extinction.
2 Coral rehabilitation project in the Arabian Gulf.
3 Because it causes floods to reach farther areas.

Unit 2

Concept 2.1

Lesson 1

- 1 1 b 2 c 3 b 4 d
5 d 6 c 7 b 8 a
9 d

2

Number	Correction
1 ✓	2 ✓ 3 ✓
4 x	 has a mass and a volume.
5 x	 as a solid
6 ✓	
7 x	 is an example of a gas matter.

- 3 1 gas 2 solid
3 gas 4 volume

- 4 1 Matter. 2 Volume.

- 5 1 solid 2 Water
3 liquid – gas 4 matter
5 volume

- 6 1 d 2 b 3 a

- 7 1 Oxygen. (Because the rest are examples of a solid matter.)
2 Coal. (Because the rest are examples of a gas matter.)
3 Wood. (Because the rest are examples of a liquid matter.)

- 8 Solid matter: Book – Table – Ruler
Liquid matter: Oil – Vinegar
Gas matter: Water vapor – Helium

- 9 1 b 2 a 3 c

- 10 Because it has a mass and a volume.

- 11 The state of water changes from liquid state to gas state (water vapor).

- 12 1 Air 2 Milk 3 Wood

- 13 Revision Book p. 29.

Concept 2.1

Lesson 2

- 1 1 c 2 b 3 c 4 c
5 d 6 b 7 c 8 b
9 c 10 c 11 a 12 d

2

Number	Correction
1 ✓	2 ✓
3 x	 forms of energy.
4 x	Solid matter
5 x	Gases have indefinite volume.
6 ✓	
7 x	 have a definite volume.
8 x	The temperature
9 ✓	10 ✓ 11 ✓
12 x	 move a little bit.

- 3 1 shape 2 liquid 3 gas 4 slower
5 less

- 4 1 Solid state. 2 Liquids.
3 Solid state. 4 Gas state.
5 Gas state. 6 Gas state.
7 Measuring tape. 8 Thermometer.

- 5 1 shape 2 solids 3 gases
4 liquid 5 particles
6 temperature

- 6 1 c 2 b 3 a

- 7 • Light. (Because the rest are examples of matter)

- 8 1 b 2 a 3 c 4 b

- 9 1 Because it has no definite shape and volume.
2 Because it has a definite volume and indefinite shape.
3 Because they have definite shape and volume.
4 Because oxygen is a gas matter.
5 Because the spaces between particles in water vapor is greater than the spaces between particles in water.

- 10 1 The shape of a piece of wood doesn't change.
2 The water takes the shape of the container.

- 11 1 Balance (Scale).
2 Measuring tape. (Tape measure.)
3 Thermometer. 4 Ruler.

12

P.O.C	Solid state	Liquid state	Gas State
Shape	Definite	indefinite	indefinite
Volume	Definite	Definite	indefinite
Example	Ice	Water	Steam

Concept 2.1

Lesson 3

- 1 1 b 2 c 3 c 4 a
5 c 6 b 7 d 8 b
9 a 10 d 11 a 12 b
13 b 14 c

2

Number	Correction
1 ✓	
2 x	Iron has
3 ✓	
4 x	The particle of a gaseous
5 ✓	6 ✓
7 x	, its volume decreases.
8 ✓	
9 x	 high temperature

- 3 1 Particles. 2 Gas state.
3 Electron microscope.
4 Gas state. 5 Liquid state.

- 4 1 electron microscope
2 force – increases
3 liquid – shape 4 decreases
5 solids – gases

- 5 1 x 2 x 3 ✓ 4 ✓

- 6 1 Because the normal microscope isn't powerful enough to see tiny particles of matter.
2 Because iron is a solid matter that has definite shape as its particles are held closely together.
3 Because liquids particles can slide over each other.
4 Because gas particles aren't held together and they have more spaces than liquid particles.

- 7 1 The size of the balloon increases.
2 The speed of particles increases.
3 The volume of the balloon decreases.
4 The liquid takes the shape of the container.

- 5 Ice cubes change from a solid state to a liquid state.

Concept 2.1

Lesson 4

- 1 1 b 2 d 3 c 4 d
5 b 6 c

2

Number	Correction
1 ✓	
2 x	The solar system is a model
3 ✓	
4 x	 in the right size.
5 x	Germes cannot be
6 ✓	7 ✓ 8 ✓

- 3 1 A model. 2 The globe.
3 The solar system model.

- 4 1 Model 2 microscope
3 globe – the solar system
4 Germes 5 volcano
6 solid 7 liquids – shape

- 5 1 b 2 c 3 a

- 6 1 Because solid particles have an organized arrangement, while liquid particles have a random arrangement.
2 Because models help us understand things we can't see easily.
3 Because the globe shows us the Earth's shape, the location of different countries and how much of it is covered with water.

- 7 • Water particles will have a random and not organized arrangement.

Concept 2.1

Lesson 5

- 1 1 d 2 c 3 c 4 b

2

Number	Correction
1 ✓	
2 x	Freezing vegetables
3 ✓	
4 x	Sugar and salt

- 3 1 Liquids – vinegar 2 solid
3 boil

- 4 1 c 2 a

- 5 1 To keep them fresh and ready to be used for long periods of time.
2 Because water changes from liquid state to gaseous state.

- 6 • Water changes from liquid state into solid state (ice).

Concept 2.2

Lesson 1

- 1 1 c 2 c 3 b 4 d
5 d 6 c 7 d 8 d
9 b

2

Number	Correction
1 ✓	2 ✓
3 x	 is different from
4 ✓	

5 x	 to protect it from dust and dirt.
6 x	 is flat.
7 x	The temperature
8 x	 the volume of a liquid.

- 3
- 1 Stones.
 - 2 Ceramic tiles. (Bricks.)
 - 3 Thermometer.
 - 4 Ruler.
 - 5 Measuring cup.
 - 6 Length.

- 4
- 1 Measuring cup
 - 2 animals
 - 3 balance
 - 4 flat – stones
 - 5 cold

- 5
- 1 b
 - 2 c
 - 3 d
 - 4 a

- 6
- 1 temperature
 - 2 volume

- 7
- 1 To prevent animals getting inside the home.
 - 2 To protect homes from dust and dirt.

- 8
- 1 Sticks and leaves can't protect the home from dust and dirt.
 - 2 The rain and snow can't slide down and build up on the roof.

- 9
- 1 It is used to measure the volume of a liquid matter.
 - 2 It is used to measure the length of matter.
 - 3 It is used to measure the mass of matter.
 - 4 It is used to measure the temperature of matter.

Concept 2.2

Lesson 2

- 1
- 1 d
 - 2 c
 - 3 b
 - 4 c
 - 5 c

2

Number	Correction
1 ✓	
2 x	 in their color only.
3 ✓	
4 x	 smaller size
5 ✓	6 ✓

- 3
- 1 physical
 - 2 Flour – sugar
 - 3 sight – touch
 - 4 smell

- 4
- 1 c
 - 2 b
 - 3 a

- 5
- Because both sugar and salt have white color.

Concept 2.2

Lesson 3

- 1
- 1 c
 - 2 a
 - 3 c
 - 4 d
 - 5 a
 - 6 b
 - 7 c
 - 8 b
 - 9 d
 - 10 c
 - 11 c
 - 12 c
 - 13 d
 - 14 d
 - 15 c
 - 16 b
 - 17 c
 - 18 c

2

Number	Correction
1 ✓	
2 x	One kilogram = 1000 grams.
3 ✓	4 ✓ 5 ✓
6 x	 is greater than
7 x	 must be unequal.
8 ✓	
9 x	 physical properties of matter.
10 x	 the sense of sight.
11 ✓	

- 3
- 1 Physical properties.
 - 2 Chemical properties.

- 3 Volume. 4 Mass.
5 Temperature.

- 4 1 3000 2 500
3 chemical 4 physical
5 mass (structure) 6 increases

- 5 1 Gram (Because the rest are from the measuring units of volume.)
2 Burning (Because the rest are examples of physical properties of matter.)
3 Measuring cup (Because the rest are from the measuring units of volume.)
4 Iron nail (Because the rest are materials that aren't attracted to the magnet.)
5 Stone (Because the rest are materials that float on water surface.)

6

Physical properties	Chemical properties
Texture of sand White color of sugar Sinking in water Spicy taste of pepper Vinegar odor	Burning of wood Rusting of iron

- 7 1 c 2 b 3 a 4 c

- 8 1 Because a new substance with different properties is formed.
2 Because when the speed of particles increases, they produce thermal energy causing increasing the temperature of matter.
3 Because sand is not attracted to the magnet, while iron nails are attracted to the magnet.

- 9 1 Ash is formed.
2 The matter temperature increases.
3 The iron nail rusts.

- 4 The wooden cube floats on the water surface, while the metallic spoon sinks in water.
5 The paper clips are attracted to the magnet.

Concept 2.2

Lesson 4

- 1 1 d 2 c 3 a 4 d
5 b 6 c 7 c 8 d
9 c 10 d

2

Number	Correction
1 ✓	2 ✓
3 x	 because it is not poisonous.
4 ✓	
5 x	Glass is a transparent
6 x	 gloves and tires.
7 ✓	
8 x	 a good conductor of heat.

- 3 1 Helium. 2 Glass.
3 Copper. 4 Conduction.
4 1 Helium – air 2 Steel – rubber
3 glass – transparent 4 copper – wood
5 Rubber – flexible – waterproof

- 5 1 (1) – (4) 2 steel – hard – strong
3 helium – air

- 6 1 Because helium is lighter than air, so it rises up in the air.
2 Because copper is a good conductor of electricity and also can be stretched into thin, flexible wires.
3 Because copper is a good conductor of heat, while plastic and wood are bad conductor of heat.

- 4 Because rubber is flexible and waterproof.
5 Because glass is smooth and transparent.

- 7 1 Blimps rise up in the air.
2 We will feel hot on touching them.

- 8 • Revision Book p. 37.

Concept 2.3

Lesson 1

- 1 1 d 2 b 3 a 4 c
5 c 6 d 7 b

2

Number	Correction
1 x	, they move faster.
2 ✓	3 ✓
4 x	, they don't turn into water.
5 ✓	6 ✓
7 x	 state of matter.

- 3 1 solid – liquid 2 faster
3 Melting
4 thermal energy – cooking food
5 mass 6 energy

- 4 1 Melting process.
2 The sun. 3 Liquid state.

- 5 1 Because heat is a form of energy known as thermal energy.
2 Because the particles of chocolate absorb thermal energy, so they vibrate faster and spread out turning into a liquid state.

- 6 1 The mass of ice cubes doesn't change.
2 The water particles move faster.

- 7 (A) c
(B) 1 c 2 a 3 c

Concept 2.3

Lesson 2

- 1 1 b 2 c 3 b 4 d
5 b 6 b 7 a 8 a
9 d 10 b 11 b 12 a
13 b 14 d 15 b 16 b
17 c

2

Number	Correction
1 x	By increasing
2 ✓	
3 x	, it turns into a gas state.
4 ✓	5 ✓
6 x	 increases.
7 ✓	
8 x	, it condenses and changes into a liquid state.

- 3 1 reversible 2 boiling
3 physical 4 decrease

- 4 1 Physical changes. 2 °C
3 Evaporation process.
4 Condensation process.
5 Freezing process. 6 Liquid state.

- 5 1 melting – condensation
2 solid – liquid 3 temperature
4 0 5 gaining 6 liquid
7 gains 8 Steam 9 closer – ice

- 6 1 Water vapor 2 Gas
3 Ice 4 Solid

- 7 1 a 2 d 3 c 4 b

- 8 (A) 1 c 2 a 3 c 4 b
(B) 1 x 2 ✓ 3 x

- 9 • d

- 10 1 Because ice particles gain thermal energy and move faster away from each other causing ice to change solid state to liquid water.
 2 Because when water vapor hits cooler air, it condenses into tiny droplets which look like small white clouds.
 3 Because there's a change in the state of ice only without changing its structure.

- 11 1 Water changes from liquid state into solid state (ice).
 2 Water vapor condenses and changes from gas state into liquid water.
 3 Water freezes and changes from liquid state into ice (solid state).

Concept 2.3

Lesson 3

- 1 1 b 2 b 3 a 4 d
 5 c 6 b 7 d

2

Number	Correction
1 ✓	
2 x	 of two or more substances.
3 x	The components of a mixture can be
4 ✓	
5 x	 a gas substance is formed.
6 x	The color only of iodine
7 ✓	
8 x	The properties of water doesn't changes
9 x	 made of solid materials.
10 ✓	
11 x	 different size of particles.
12 ✓	
13 x	 not change.

- 3 1 mixture 2 mixture
 3 lower 4 30 5 chemically

- 4 1 Mixture. 2 Compound.
 3 Atmosphere. 4 Filtration.
 5 Evaporation.

- 5 1 evaporation 2 filtration
 3 filtration - evaporation
 4 Compound 5 Mixture

- 6 1 d 2 a 3 b 4 c

- 7 • By heating the salty water, water evaporates and salt remains.

- 8 1 d 2 c 3 b

- 9 1 Because it is formed of more than one type of fruit that aren't chemically combined.
 2 Because it composes of some gases that aren't chemically combined.
 3 Because the components of a mixture aren't chemically combined.
 4 Because sand is a solid material that doesn't dissolve in water.
 5 Because a new compound with a dark blue color is formed.

- 10 1 Water evaporates, and the salt remains.
 2 The iodine color turns into dark blue as a new compound is formed.
 3 Gas bubbles are formed.

Concept 2.3

Lesson 4

- 1 1 c 2 a 3 d 4 d
 5 c 6 b 7 c 8 b
 9 b 10 c 11 b 12 c
 13 b 14 d

2

Number	Correction
1 ✓	2 ✓
3 x	 can't be reversed easily.

4	✓	
5	x	 doesn't cause a change in its taste.
6	x	 is a chemical change.
7	✓	
8	x	 with oxygen and water.
9	x	Burning of wax
10	x	 a chemical change.
11	x	Vinegar can't be

- 8 1 physical – chemical 2 chemical
3 chemical – physical 4 chemical – physical
5 physical 6 chemical
7 chemical 8 physical

- 4 1 b 2 d 3 a 4 c

5

Chemical changes	Physical changes
Burning wood	Making fruit salad
Making bread	Melting Wax
Burning a toast	Folding clothes
	Cutting paper
	Boiling water

- 6 1 Chemical. 2 Physical.
3 Physical 4 Chemical.
5 Chemical. 6 Physical.

- 7 1 liquid – solid 2 hydrogen
3 physical – cooling
4 oxygen – water – rust
5 chemical

- 8 1 Because it is a change in the shape and size of fruits without any change in their structure.
2 Because a new substance (ash) is formed.
3 Because it is a change in the state of ice only without any change in its structure.
4 Because a gas is produced that causes inflating the balloon.

- 9 1 It produces a bad smell.
2 The iron rusts as it reacts with oxygen and water.
3 A heat is released that can start a fire.
4 A gas (new substance) is formed.

Concept 2.3

Lesson 5

- 1 1 b 2 c 3 b 4 c
5 c 6 d

2

Number	Correction
1	✓
2	✓ a mixture.
3	x by filtration and evaporation.
4	x includes filtration and evaporation processes.
5	x fish, shells and seaweed from seawater.
6	x Seawater doesn't become
7	✓ 8 ✓

- 3 1 Desalination process.
2 Filtration process.
3 Evaporation process.

- 4 1 filtration 2 salt – evaporation
3 energy 4 gases – minerals
5 salt water – dehydrates

- 5 1 Because it composes of water, salt, other minerals, gases, living organisms and dead organisms.
2 Because drinking salt water makes the human body dehydrate faster.

- 6 • It harms the marine organisms.

- 7 1 ✓ 2 x 3 x 4 x
5 ✓

Assessments Model Answers

Assessment ① Concept 1.1 Lesson 1

- Q1 (A)** 1 d 2 d 3 c
(B) 1 Because they absorb water and nutrients from the soil.
 2 Because food provide animals' body with the needed energy to survive and do all activities.

- Q2 (A)** 1 x 2 ✓ 3 ✓
(B) Because plants can make their own food by photosynthesis process, while animals must eat food to get energy.

- Q3 (A)** 1 The sun. 2 Stem.
(B) a. Leaf. b. Stem. c. Root.

Assessment ② Concept 1.1 Lesson 2

- Q1 (A)** 1 Germination process.
 2 Oxygen gas. 3 Leaves.
(B) 1 Soil. 2 Soil.
Q2 (A) 1 Soil. 2 Glucose.
 3 similar to
(B) 1 The seed germinates.
 2 The plant will not grow well, and its leaves become pale green.
Q3 (A) 1 Water 2 Carbon dioxide
 3 oxygen
(B) 1 It carries water and nutrients from the plant's roots to its leaves.
 2 They absorb water and nutrients from the soil.

Assessment ③ Concept 1.1 Lesson 3

- Q1 (A)** 1 tuber - runner 2 wood - narrow
(B) • Carbon dioxide gas
Q2 (A) 1 b 2 d 3 a 4 c

- (B)** Because plants produce oxygen gas that humans and animals need to breathe during photosynthesis process.

- Q3 (A)** 1 Xylem 2 Glucose sugar
 3 plant's leaves
(B) 1 upright 2 climb

Assessment ④ Concept 1.1 Lesson 4

- Q1 (A)** 1 c - d 2 d - c
 3 a - b 4 b - a
(B) • Plant reproduction
Q2 (A) 1 chemical 2 atria
 3 sugar 4 nose
(B) • The plant can't reproduce.
Q3 (A) 1 Flowers. 2 Blood capillaries.
 3 Human circulatory system.
(B) 1 It pumps blood rich in nutrients and oxygen to all body parts.
 2 They allow air to enter the plant's leaves.

Assessment ⑤ Concept 1.1 Lesson 5

- Q1 (A)** 1 (2) 2 (1) 3 size - shape
(B) 1 Because they are light seeds.
 2 Because burdock seeds have spines.
Q2 (A) 1 (4) 2 (2) 3 (1) 4 (3)
(B) • Dispersed by sunlight.
Q3 1 Coconut seeds.
 2 Sunflower. 3 Pine.
 4 Vine (Grapes). 5 Oxygen gas.

Assessment ⑥ Concept 1.2 Lesson 1

- Q1 (A)** 1 b 2 d 3 b
(B) 1 Because an ecosystem provides living organisms with water, food and shelter.

- 2 Because hawk feeds on animals that feed on plants.

Q2 (A) 1 Space 2 Rabbit
(B) 1 decomposes – soil 2 interaction

Q3 (A) 1 x 2 x 3 x
(B) • It dies or moves to another ecosystem.

Assessment ⑦ Concept 1.2 Lesson 2

Q1 (A) 1 Z 2 x 3 Y
(B) 1 Because decomposers return nutrients back to the ecosystem by decomposing the dead organisms.
2 Because humans can't make their own food and they depend on other living organisms to get needed energy.

Q2 (A) 1 Grass 2 Locusts
(B) 1 prey 2 decomposers
3 energy

Q3 (A) 1 Grass → Mouse → Snake → Hawk → Bacteria
2 Carrot → Rabbit → Snake → Eagle → Earthworm
(B) 1 The sun. 2 Food chain.
3 Glucose.

Assessment ⑧ Concept 1.2 Lesson 3

Q1 (A) 1 b 2 b 3 d
(B) 1 Because the food web shows the interactions among many food chains, so it contains many organisms. While a food chain shows the interactions among few organisms.
2 Because the sun is the primary source of energy for all living organisms on Earth.

Q2 (A) 1 x 2 x
(B) 1 nutrients - fertility
2 primary consumers

Q3 (A) 1 B 2 A 3 C 4 D
(B) • decomposer

Assessment ⑨ Concept 1.2 Lesson 4

Q1 (A) 1 plants 2 natural areas
3 light
(B) 1 Food web.
2 Restoration ecology.

Q2 (A) 1 Sunlight 2 Seeds
3 Maple seeds

(B) 1 energy 2 prey
Q3 (A) 1 x 2 x 3 ✓ 4 x
5 ✓

Assessment ⑩ Concept 1.3 Lesson 1

Q1 (A)

Gentle rain	Heavy rain
improves – rainwater makes producers grow then consumers feed on producers.	harms – it causes flooding.

(B) • Algae → Zooplankton → Coral
→ Triggerfish → Shark

Q2 (A) 1 marine 2 algae 3 hot

(B) 1 Primary consumers move to another ecosystem, or they die.
2 They die, due to lack of food resources.

Q3 (A) 1 Overfishing.
2 Preventing overfishing of coral reefs.
3 Eagle.

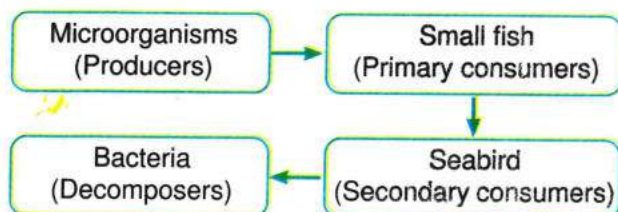
(B) 1 Because they make their own food through photosynthesis process.
2 Because it causes water pollution.

Assessment ⑪ Concept 1.3 Lesson 2

Q1 (A) 1 Fox 2 snake – mouse
3 grass 4 snake

Q2 (A) 1 increases 2 cold
3 seabirds

(B)



- Q3 (A)** 1 Top predators. 2 Decomposers.
3 Small fish.

(B) 1 x 2 x

Assessment 12 Concept 1.3 Lesson 3

- Q1 (A)** 1 c 2 d 3 b 4 a

(B) • Because they are toxic and sharp.

- Q2 (A)** 1 ingest – filter 2 sunlight
3 Population

(B) • Coral bleaching occurs and the color of coral reefs turns into white.

- Q3 (A)** 1 extinction 2 negative
3 habitat loss

- (B) 1 Reducing the usage of plastic products or recycling plastic products.
2 Seabirds.

Assessment 13 Concept 1.3 Lesson 4

Q1 (A)

Habitat restoration	Habitat loss
Zero plastic. – Coral reef rehabilitation project.	Eroding river banks. – Adding buildings.

(B) Nursery.

- Q2 (A)** 1 ✓ 2 x 3 ✓ 4 x

(B) It will decrease.

- Q3** a. 3 b. 1 c. 4 d. 5
e. 2

Assessment 14 Concept 2.1 Lesson 1

Q1 (A)

Solid state	Liquid state	Gas state
Gold Coal	Oil Tea	Nitrogen Carbon dioxide

(B) • Because ice has a mass and volume.

- Q2 (A)** 1 Volume 2 gas 3 three

(B) 1 Oxygen 2 Juice

- Q3 (A)** 1 b 2 c 3 a

(B) 1 color 2 mass
3 volume

Assessment 15 Concept 2.1 Lesson 2

- Q1 (A)** 1 c 2 b 3 a

(B) 1 Because water has a definite volume and an indefinite shape.

2 Because oxygen is a gas matter.

- Q2 (A)** 1 d 2 c 3 b 4 a

(B) • Light

- Q3 (A)** 1 particles 2 volume - shape
3 solid

(B) • indefinite volume

Assessment 16 Concept 2.1 Lesson 3

- Q1 (A)** 1 Particles.
2 Electron microscope.
3 Gas state.

(B) 1 The size of the balloon decreases.
2 The speed of water particles decreases.

- Q2 (A)** 1 Ice – Water – Water vapor.
2 Water vapor – Water – Ice.

(B) 1 b 2 d 3 a

- Q3** 1 (2) 2 (1) 3 (2) 4 (3)
5 (1)

Assessment 17 Concept 2.1 Lesson 4 & 5

- Q1 (A)** 1 an organized 2 shape
3 gas 4 right size

(B) • To keep vegetables fresh and ready to be used for longer period of time.

Q2 (A) 1 b 2 c 3 d 4 a

(B) The speed of particles decreases.

Q3 (A) 1 definite 2 the sun – planets
3 Model

(B) 1 solid 2 increase

Assessment 18 Concept 2.2 Lesson 1

Q1 (A) 1 flat 2 inclined
3 animals 4 flat

Q2 (A) 1 Volume.
2 Ceramic bricks. (Tiles.)
3 Tape measure. (Measuring Tape.)

(B) 1 It is used to measure the mass of the matter.
2 It is used to measure the temperature of the matter.

Q3 (A) 1 climate 2 specific tools
3 our senses 4 suitable usage

(B) • To protect it from dust and dirt.

Assessment 19 Concept 2.2 Lesson 2&3

Q1 (A) a. Chemical property. b. Physical property.
c. Physical property. d. Chemical property.

(B) The iron nail gets attracted to the magnet, while the stone does not get attracted to the magnet.

Q2 (A) 1 Volume. 2 Mass.
3 Temperature.

(B) 1 3000 2 500

Q3 (A) 1 size 2 density
3 touch

(B) 1 Gram 2 Iron nail

Assessment 20 Concept 2.2 Lesson 4

Q1 (A) 1 Steel. 2 Glass.
3 Rubber. 4 Copper.

(B) Conduction.

Q2 (A) 1 Because helium gas is lighter than air.

2 Because rubber is flexible and waterproof.

3 Because copper is good conductor of electricity and can be stretched into thin wires.

(B) • copper - plastic

Q3 (A) 1 Physical property.
2 Chemical property.
3 Physical property.
4 Chemical property.

(B) • You will feel hot.

Assessment 21 Concept 2.3 Lesson 1

Q1 (A) 1 faster 2 thermal energy
3 slower

(B) 1 The mass doesn't change.
2 Their kinetic energy increases.

Q2 (A) 1 Water 2 Copper

(B) 1 Melting process.
2 Liquid state.

Q3 (A) 1 increases 2 Solid
3 sun

(B) Helium – Water – Butter.

(C) • equal to

Assessment 22 Concept 2.3 Lesson 2

Q1 (A) a. Melting b. Evaporation
c. Freezing d. Condensation

e. Solid f. Gas

(B) 1 Liquid state. 2 Physical change.

Q2 (A) 1 Evaporation
2 Particles spread out
3 Decreasing temperature

(B) 1 It changes from liquid state to gas state (water vapor).

2 It changes from liquid state to solid state (ice).

- Q3 (A)** 1 mass 2 melting
3 temperature 4 freezing

(B) • Because when water vapor hits cooler air, it condenses into tiny water droplets which look like small visible white clouds.

Assessment 23 Concept 2.3 Lesson 3

- Q1 (A)** 1 c 2 d 3 a 4 b

(B) • Because atmosphere (air) consists of different gases.

- Q2 (A)** 1 baking soda 2 mixture
3 4

(B) 1 Fruit salad. 2 Filtration.

- Q3 (A)** 1 x 2 ✓ 3 ✓ 4 x

(B) • Compound.

Assessment 24 Concept 2.3 Lesson 4

- Q1** 1 Physical change.
2 Chemical change.
3 Chemical change.
4 Chemical change.
5 Chemical change.

- Q2 (A)** 1 ash 2 physical
3 dark blue color

(B) • Because there is a change in the shape of paper only without any change in its structure.

(C) • Heat is produced that starts a fire.

- Q3 (A)** 1 Lightning a match
2 Bending a metal spoon
3 Rotting on a toast

(B) 1 iron oxide 2 vinegar

Assessment 25 Concept 2.3 Lesson 5

- Q1** 1 x 2 x 3 ✓ 4 ✓
5 ✓

- Q2 (A)** 1 70% 2 fresh
3 loses

(B) Because it consists of water, salt, minerals, living organisms and dead organisms.

(C) Because drinking salt water makes human dehydrate and lose water quickly.

- Q3 (A)** 1 It is very expensive.
2 It requires a lot of energy.

(B) Filtration – Evaporation – Condensation

(C) • minerals - evaporation

Model Exams on Concepts

Model answers

Concept 1.1 Model Exam 1

- Q1 (A)** 1 b 2 c 3 c
(B) 1 Because vine has a climb stem, while pine has a wood stem.
 2 Because plants need carbon dioxide gas released from humans and animals to make their own food during photosynthesis process.
- Q2 (A)** 1 b 2 c 3 a
(B) 1 Heart. 2 Root.
- Q3 (A)** 1 Oxygen gas 2 Atria
 3 Blood
(B) 1 The plant can't make the photosynthesis process, so it dies.
 2 Gases can't move in and out the plant.
- Q4 (A)** 1 photosynthesis 2 soil
 3 upright
(B) Burdock seeds: by sticking to animals' fur or humans' clothes.
 Maple seeds: by wind.

Concept 1.1 Model Exam 2

- Q1 (A)** A: Water B: Carbon dioxide gas
 C: Oxygen gas D: Glucose sugar
(B) • Plants' leaves can't absorb needed sunlight to make its food during photosynthesis process.
- Q2 (A)** 1 c 2 a 3 c
(B) 1 Because sunlight allows carbon dioxide gas and water in plant's leaves to combine to make plant's food during photosynthesis process.
 2 Because flowers produce seeds that grow forming a new plant.
- Q3 (A)** 1 b 2 d 3 a 4 c
(B)

Plants	Animals
They can make their own food through photosynthesis process.	They depend on plants or other animals to get their food.

- Q4 (A)** 1 leaves 2 wood
 3 blood capillaries
(B) 1 They make plant's food through photosynthesis process.
 2 They increase the amount of water and nutrients absorbed from the soil.

Concept 1.1 Model Exam 3

- Q1 (A)** 1 b 2 b 3 c
(B) 1 It carries water and nutrients from plant's roots to its leaves.
 2 It absorbs sunlight needed for making plant's food through photosynthesis process.
- Q2 (A)** 1 narrow – needles 2 atria – ventricles
 3 roots – xylem
(B) • x
- Q3 (A)** 1 Soil 2 Glucose sugar
 3 Pine
(B) 1 Maple (dandelion) seeds.
 2 Burdock seeds.

Q4 (A)

Arteries	Veins
(1) oxygen	(5) carbon dioxide
(2) nutrients	(6) wastes
(3) heart	(7) all body parts
(4) all body parts.	(8) heart.

- (B)** 1 Because plants produce oxygen gas needed for respiration of humans and animals during photosynthesis process.
 2 Because they absorb water and nutrients needed for plants to make their own food during photosynthesis process.

Concept 1.1 Model Exam 4

- Q1 (A)** 1 x 2 x 3 x

(B) 1 The plant can't get carbon dioxide gas needed for making its food through photosynthesis process, so the plant can't grow well.

2 They can't be dispersed as they can't stick to animals' fur or humans' clothes.

Q2 (A) 1 (2) 2 (1) – wind

(B) 1 It transports oxygen and nutrients through the blood to all the body cells.

2 They helps in the plant's reproduction by producing seeds.

Q3 (A)

Phloem	Xylem
(1) glucose	(5) water
(2) sugar	(6) nutrients
(3) leaves	(7) roots
(4) all plant's parts	(8) leaves

(B) 1 Tuber stem. 2 Wood stem.

Q4 (A) 1 Water. 2 Plant's leaves.

(B) • The plant can't make its own food during photosynthesis process.

(C) 1 Flowers 2 Heart

Concept 1.2 Model Exam 1

Q1 (A) 1 grasses – decomposition

2 grasses 3 Eagle

(B) • Because waste material is rich in nutrients that increase the soil fertility.

Q2 (A)

P.O.C	Prey	Predator
Definition	It is the animal that is eaten by another animal.	It is the animal that eats another animal.

(B) 1 Locusts 2 Grasses

3 Rabbit

Q3 (A) 1 d 2 b 3 c

(B) 1 primary 2 Decomposers

Q4 (A) 1 x 2 x

(B) 1 Consumers. 2 Ecosystem.

3 Food web.

Concept 1.2 Model Exam 2

Q1 (A) 1 photosynthesis 2 respiration

3 decomposition – nutrients

(B) • Because decomposers recycle nutrients back to ecosystem by decaying the dead organisms.

Q2 (A) 1 c 2 a

(B) 1 Eagle. 2 Wind.

3 Rainforest (Desert).

Q3 (A) 1 d 2 d 3 c

(B)

Food chain	Food web
It shows the interaction between few living organisms.	It shows the interaction between many living organisms.

Q4 (A) 1 ✓ 2 x

(B) 1 Producers. 2 Glucose.

(C) • Soil fertility decreases.

Concept 1.2 Model Exam 3

Q1 (A) 1 Area (A)

2 Area (B), because the hawk can't find any food as this area contains only producers which hawk can't eat.

3 It is returned back to the ecosystem by decomposers.

(B) 1 millipedes – soil fertility

2 consumer

Q2 (A) 1 b 2 b 3 d

(B) 1 Producers. 2 Predator.

Q3 (A) 1 C 2 B

(B) 1 Because they feed on producers to get their energy.

2 Because consumers can't make their own food.

(C) • The number of secondary consumers increases.

Q4 (A)

P.O.C	Producers	Decomposers
Definition	They are organisms that can make their own food through photosynthesis process.	They are organisms that carry out the decomposition process by decaying dead organisms.
Example	Plants	Bacteria – Fungi

(B) • Seeds → Squirrel → Hawk → Eagle
→ Bacteria.

Concept 1.2 Model Exam 4

Q1 (A) 1 C 2 B

(B) 1 Because decomposers recycle nutrients back to the soil by decaying dead organisms.

2 Because the sun is the main source of energy for all living organisms.

3 Because hawks eat animals that eat plants.

4 To get the energy needed to do all vital activities.

Q2 (A) 1 Food – oxygen gas

2 Primary 3 more

4 consumers – worms

(B) ✓

Q3 (A) 1 c 2 a 3 d

(B) 1 The secondary consumers move to another ecosystem searching for food, or they die.

2 Plants can't make their own food through photosynthesis process, so there will be no life on Earth.

Q4 (A) 1 Caracal 2 Bacteria

(B) 1 Oxygen gas.

2 The sun. 3 Food chain.

Concept 1.3 Model Exam 1

Q1 (A) 1 increase 2 decrease

(B) 1 Coral bleaching occurs, and the color of coral reefs turns into white

2 Many species in this habitat may be lost because they can't get their needs to survive.

Q2 (A) 1 d – c 2 c – d

3 b – a 4 a – b

(B) 1 Overfishing.

2 Throwing plastic garbage in sweater.

Q3 (A) 1 c 2 b 3 d

(B) 1 Top predators. 2 Nursery.

Q4 (A) 1 Q – X 2 Y

(B) 1 microplastics 2 flooding.

Concept 1.3 Model Exam 2

Q1 (A) 1 b 2 d 3 a 4 c

(B) • Because they are sharp and toxic.

Q2 (A) 1 It is the number of organisms of one type of species living in an area.

2 It is the process of returning a habitat back to its natural state before harm was done.

(B) • Microorganisms → Small fish → Seabirds
→ Bacteria.

(C) 1 Algae 2 Squirrel

Q3 (A) 1 b 2 c 3 b

(B) 1 Shark. 2 Algae.

Q4 (A) 1 They provide marine organisms with food and shelter.

2 It is used in rehabilitation of coral reefs.

(B) 1 They are broken down into smaller pieces called microplastics.

2 Microorganisms will move to another cooler place.

3 The population of this species decreases.

Concept 1.3 Model Exam 3

- Q1 (A)** 1 tertiary 2 zooplankton
(B) 1 Because they can make their own food by photosynthesis process.
2 Because rain water helps producers to grow, and then consumers feed on them.
3 To absorb sunlight needed to make their own food by photosynthesis process.

- Q2 (A)** 1 Overfishing.
2 Population change.
3 Coral bleaching. 4 Coral reefs.

- (B) 1 Corals

- Q3 (A)** 1 b 2 a

- (B) 1 The number of marine organisms decreases.
2 Some seabirds move to a new habitat, while others die.
3 They would die as they can't find any food.

- Q4 (A)** 1 x 2 x

- (B) 1 filter – microplastics
2 Sea turtle – plastic
3 energy – predator

Concept 1.3 Model Exam 4

- Q1 (A)** 1 Mackerel 2 Microorganisms
3 mackerel – tuna
4 Small fish – Mackerel

- (B) • Algae → Clam → Sea star → Shark.

- Q2 (A)** 1 x 2 x

- (B) 1 Because coral reefs get rid of algae living in their tissues.
2 Because algae can make their own food by photosynthesis process.
3 Because the food resources will not be enough for them.

- Q3 (A)** 1 a 2 b 3 d

- (B) 1 Rising of seawater temperature.
2 Ingesting microplastics.

- Q4 (A)** 1 Seabirds 2 Butterflies

- (B) 1 light 2 improve – harm
3 Habitat restoration

Concept 2.1 Model Exam 1

- Q1 (A)** 1 liquid 2 gas
3 (1) - indefinite

- (B) x

- Q2 (A)** 1 c 2 a

- (B) 1 The arrangement of particles become random and not organized.
2 The shape and volume of the coin don't change.
3 The speed of water particles increases.

- Q3 (A)** 1 b 2 c

- (B) 1 Liquid state.
2 Volume. 3 Globe.

- Q4 (A)** 1 Light 2 Iron

- (B) 1 It helps us see the shape and different parts of a germ without a microscope.
2 It helps us to see tiny objects that can't be seen by the naked eye such as the components of one blood cell.

- (C) • It is anything that has a mass and volume.

Concept 2.1 Model Exam 2

- Q1 (A)** • x

- (B) 1 The liquid takes the shape of the container, while its volume doesn't change.
2 The speed of water particles decreases.

- (C) 1 Matter. 2 Measuring tape.

- Q2 (A)** 1 b 2 d

- (B) 1 Because it has a mass and volume.
2 Because carbon dioxide is a gas matter.
3 Because it has a definite shape and

volume.

Q3 (A)

	Liquid state	Gas state
Shape	It has no definite shape.	It has no definite shape.
Volume	It has a definite volume.	It has no definite volume.
Movement of its particles	They move freely.	They move very freely in all directions.

(B) 1 Oil 2 Air

Q4 (A) Gold – Milk – Steam.

(B) 1 solid 2 vibrate
3 faster – increases

Concept 2.1 Model Exam 3

Q1 (A) 1 (3) 2 (1)

3 (2)

(B) 1 Because water is a liquid matter that has no definite shape.
2 Because matter particles are tiny that we can't see by the naked eye.

Q2 (A) 1 x 2 ✓

(B) 1 Gases. 2 Microscope.
3 Model.

Q3 (A) 1 c 2 d 3 d

(B) 1 The size of the balloon increases.
2 The spaces between particles increases.

Q4 (A) 1 Gas 2 Liquid 3 Solid

(B) 1 It is the space that a matter takes up.
2 They are the building units of matter.

Concept 2.1 Model Exam 4

Q1 (A) 1 c 2 a 3 b

(B) 1 Because they are not held together.
2 Because it is a solid matter.

Q2 (A) 1 shape 2 force

3 solid

(B) 1 b 2 a

Q3 (A) 1 x 2 ✓

3 x

(B) 1 The particles have an organized arrangement with a regular pattern.
2 It changes from solid state to liquid state.

Q4 (A) 1 Gas state. 2 Particles.

(B) 1 more 2 shape

3 lower (less)

Concept 2.2 Model Exam 1

Q1 (A) 1 flat – strong stones

2 inclined – ceramic tiles

(B) 1 ✓ 2 x 3 ✓

Q2 (A) 1

P.O.C	Helium	Rubber
Usage	It is used to fill balloons and blimps.	It is used in making clothes and cars tires.

2

P.O.C	Mass	Volume
Measuring tool	Balance (scale)	Measuring cup

(B) Because copper is a good conductor of electricity and can be stretched into wires.

Q3 (A) 1 d 2 c 3 a

(B) 1 The paper clips get attracted to the magnet.

2 Its mass doesn't change.

Q4 (A) • Helium

(B) 1 tape measure 2 1000

3 temperature 4 wood – plastic

Concept 2.2 Model Exam 2

- Q1 (A)** 1 Because the shape of the paper changes without any change in its structure.
2 Because paper interacts with fire forming a new matter (ash).

- (B)** 1 climate 2 physical
3 one

- Q2 (A)** 1 size 2 increases
3 unequal

- (B)** 1 Glass. 2 Volume.

- Q3 (A)** 1 b – c 2 c – b
3 a – a

- (B)** 1 It is used to measure the mass of matter.
2 It is used to measure the temperature of matter.

- Q4 (A)** 1 c 2 b 3 a
(B) 1 Cm^2 2 Iron nail

Concept 2.2 Model Exam 3

- Q1 (A)** 1 Chemical property.
2 Physical property.
3 Chemical property.

- (B)** 1 Snow and rain will be collected on the roof.
2 You will feel warm.

- Q2 (A)** 1 x 2 x 3 x

- (B)** 1 It is used to measure the volume a liquid.
2 It is used to measure the length of matter.

Q3 (A)

	Mass	Volume
Definition	It is the measurement of the amount of matter.	It is the space that a matter takes up.
Measuring unit	Gram – Kilogram	Liter – mL – Cm^3

- (B)** • Hammers

- Q4 (A)** 1 d 2 a 3 b
(B) 1 Copper. 2 Temperature.

Concept 2.2 Model Exam 4

- Q1 (A)** 1 volume 2 masses
3 floats on 4 iron

- (B)** • Temperature.

- Q2 (A)** 1 Sticks and leaves. 2 animals.
3 Strong stones. 4 dust and dirt.

- (B)** 1 Because thermal energy is produced.
2 Because copper is good conductor of heat.
3 Because it is not poisonous or flammable.

- Q3 (A)** 1 x 2 x 3 ✓

- (B)** 1 Rubber. 2 Helium.

- Q4 (A)** 1 physical 2 thermal energy
3 volume

- (B)** 1 Measuring cup 2 Gram

Concept 2.3 Model Exam 1

- Q1 (A)** 1 melting 2 mass
3 liquid – increases

- (B)** • Because it consists of a group of some gases.

- Q2 (A)** 1 Chemical change.
2 Chemical change.
3 Physical change.

- (B)** 1 It increases.
2 Water changes from liquid state to gas state.

- Q3 (A)** 1 c 2 b 3 d

- (B)** 1 Condensation process.
2 Physical changes.

Q4 (A) x

- (B)** 1 thermal energy
2 smaller 3 solid
4 Filtration

Concept 2.3 Model Exam 2

- Q1 (A)** 1 b 2 a 3 a
(B) 1 A gas is formed.
 2 Water evaporates and the salt remains.

- Q2 (A)** 1 b 2 d 3 b
(B) 1 Iron rusting.
 2 Atmosphere (Air).

- Q3 (A)** 1 x 2 x 3 ✓
(B) 1 Because it is a mixture of water, salt, minerals, gases, living organisms and dead organisms.
 2 Because wood reacts with fire forming a new substance called ash.

Q4 (A)

	Freezing	Evaporation
Definition	It is the process in which matter changes from a liquid state to a solid state by cooling.	It is the process in which matter changes from a liquid state to a gas state by heating.
Motion of matter particles	Matter particles move slower and get closer to each other.	Matter particles move faster and spread away from each other.

- (B)** • Burning of wax

Concept 2.3 Model Exam 3

- Q1 (A)** 1 Melting of wax
 2 Sugar 3 Making cake

- (B)** 1 Burning of wood.
 2 Nuts mixture or Fruit salad.

- Q2 (A)** 1 energy 2 boiling
(B) 1 Because salt dissolves in water.
 2 Because the components of a mixture don't combine chemically together.
 3 Because there's a change in the shape

and size only of the fruit without any change in their structure.

- Q3 (A)** 1 d 2 b 3 b

- (B)** 1 Compound.
 2 Desalination process.

- Q4 (A)** 1 physical – chemical
 2 Heat - fire 3 oxygen – water
 4 solid – liquid

- (B)** Sand is separated by filtration, then salt is separated by evaporation process.

Concept 2.3 Model Exam 4

- Q1 (A)** 1 d 2 c 3 b 4 a

- (B)** • Chemical change.

- Q2 (A)** 1 x 2 ✓ 3 x

- (B)** 1 A new dark blue colored compound is formed.
 2 A reddish layer of rust is formed on the iron nail.

- Q3 (A)** 1 Filtration 2 chemical
 3 mixture 4 physical

- (B)** • Salty water.

- Q4 (A)** 1 c 2 b

- (B)** 1 Because a new substance is formed.
 2 Because water vapor loses thermal energy and condenses forming water drops.
 3 Because ice cubes gain thermal energy, so ice changes from a solid state to a liquid state.

Assess Your Learning (School Book) Model Answers

Unit 1

- 1 1 c 2 b 3 b
4 a 5 d 6 b

2 1

Presence of Light	In the Darkness
The plant grows faster and becomes taller with green dark leaves.	The plant grows at a slower rate, and its leaves become pale green.

2

Transportation in Plants	Transportation in Humans
- It consists of a group of tubes which are xylem and phloem. - It transports water and nutrients from the roots to the leaves through the xylem and the food from the leaves to all plant parts.	- It consists of three types of vessels which are arteries, veins and blood capillaries. - It transports oxygen, nutrients and waste through blood to all body cells.

3

Producers	Consumers
- They are the living organisms that can make their own food by the photosynthesis process. - Example: plants	- They are the living organisms that feed on other organisms to get energy as they can't make their own food. - Example: animals

- 3 1 ✓ 2 x 3 ✓ 4 x 5
✓ 6 x

- 4 1 **Decomposers** help in the decomposition of the remains of plants and dead animals into nutrients that can be returned to the ecosystem.
2 Rising the temperature of the water turns the color of the coral reefs into **white**.
3 Producers need **sunlight** to make photosynthesis process.

- 5 Grass (producer) → Mouse (primary consumer)
→ Snake (secondary consumer) → Hawk (tertiary consumer)

Unit 2

- 1 d 2 c 3 d 4 b
5 d 6 a 7 a 8 c
9 a 10 b

PONY Final Exams Model Answers

Model Exam 1

- Q1 (A)** • Heart
(B) 1 Temperature. 2 Decomposers.
 3 Model.
 4 Habitat restoration.
- Q2 (A)** • X
(B) 1 mass – volume 2 copper – heat
 3 filtration 4 cold
- Q3 (A)** 1 c 2 a
(B) 1 Because hawks eat animals that eat plants.
 2 To protect it from dust and dirt.
 3 Because the coral reefs get rid of algae living in their tissues.
- Q4 (A)** 1 b 2 c
(B) 1 Water changes from liquid state into solid state (ice)
 2 The population of this species decreases.
(C) Pine tree narrow leaves and a wood stem.

Model Exam 2

- Q1 (A)** • ✓
(B) 1 Water particles move, vibrate and spin faster and spread out from each other.
 2 It decreases.
 3 Mass and structure of salt does not change.
 4 The liquid takes the shape of the container.
- Q2 (A)** • Wood
(B) 1 Atmosphere. 2 Fungi. (Bacteria.)
(C) 1 Because it transports oxygen and nutrients through the blood to all the body parts.
 2 Because it has a mass and volume.

- Q3 (A)** 1 Snake 2 grass
(B) 1 Compound. 2 Flowers.
 3 Solid state.
- Q4 (A)** 1 d 2 c
(B) 1 solid – liquid
 2 filter – microplastics
 3 Steel – hard and strong

Model Exam 3

- Q1 (A)** • b
(B) 1 phloem 2 improve
 3 microscope 4 mass
- Q2 (A)** • Algae → Zooplankton → Coral
 → Parrotfish → Shark.
(B) 1 Because particles of liquids slide over each other, so liquids have no definite shape.
 2 Because they recycle nutrients back to the ecosystem by decaying the dead organisms.
(C) 1 The plant can't absorb sunlight needed to make its own food during photosynthesis process.
 2 The piece of cork floats on the water surface, while the iron nail will sink in it.
- Q3 (A)** 1 X 2 X
(B) 1 They increase the amount of water and nutrients absorbed from soil.
 2 It is used to measure the temperature of a substance.
 3 It is used to fill balloons and blimps.
- Q4 (A)** 1 Rabbit. 2 Veins
(B) Ecosystem.
(C) 1 Chemical change.
 2 Physical change.

Model Exam 4

Q1 (A) • x

- (B) 1 Because it is sharp and toxic.
2 Because plants produce oxygen gas needed for breathing of humans and animals during photosynthesis process.

- (C) 1 solid – definite
2 increase – liquid

Q2 (A) • Grass → Locust → Frog → Snake
→ Owl

(B)

	Evaporation process	Condensation process
Definition	It is the process in which matter changes from a liquid state to a gas state.	It is the process in which matter changes from a gas state to a liquid state.

- (C) 1 Heat is produced that starts a fire.
2 The plant can't reproduce.

Q3 (A) 1 Oxygen 2 Kilogram
(B) 1 Ceramic tiles. 2 Coral bleaching.

3 Food chain.

Q4 (A) 1 d 2 c

- (B) 1 Fruit salad or nuts mixture.
2 Coconut seed. 3 Helium.

Model Exam 5

Q1 (A) • b

- (B) 1 chemical – glucose
2 chemical – physical
3 light – 4 Seabirds

Q2 (A) • Iron

- (B) 1 Desalination process.
2 Coral reefs.
(C) 1 It is used to measure the mass of a substance.

- 2 It is used to measure the volume of a liquid substance.

Q3 (A) 1 x 2 ✓

- (B) 1 Because the particles of gases are not held together.
2 Because it consists of group of gases that aren't combined chemically.
3 To prevent animals from getting inside it.

Q4 (A) 1 b 2 a

- (B) 1 The particles lose thermal energy, so they move slower and get closer.
2 They move to another cooler place.
3 The iron nail rusts.

Model Exam 6

Q1 (A) • Gasoline

- (B) 1 Because when water vapor hits cooler air it condenses into tiny water droplets forming visible small white clouds known as steam.
2 Because it is a change only in the size of nuts without any change in their structure.

(C) 1 Stomata. 2 Particles.

Q2 (A) • Microorganisms → Small fish → Seabirds
→ Bacteria.

(B)

P.O.C	Producers	Consumers
Definition	They are organisms that can make their own food through photosynthesis process.	They are organisms that eat other organisms to get their energy.

- (C) 1 Shark. 2 Vine.

- Q3** (A) 1 x 2 ✓
 (B) 1 They are broken down into smaller pieces called microplastics.
 2 Gas bubbles are produced.
 (C) • It is the process in which matter changes from a solid state to a liquid state.

- Q4** (A) 1 a 2 b
 (B) 1 physical – chemical
 2 1000 3 extinction

Model Exam 7

- Q1** (A) • d
 (B) 1 Roots
 2 Dandelion – wind
 (C) 1 Condensation 2 Freezing

- Q2** (A) • Algae
 (B) 1 Food web. 2 Measuring tape.
 (C) 1 Steel 2 Rubber

- Q3** (A) 1 x 2 x
 (B) 1 Because they feed on producers to get their energy.
 2 Because it transports water and nutrients from plant's roots to its leaves.
 3 Because the bread taste doesn't look like its ingredients as a new substance is formed.

- Q4** (A) 1 c 2 a
 (B) 1 The volume and shape of the coin don't change.
 2 The temperature of matter decreases.
 3 They move to another ecosystem to search for food or they die.

Model Exam 8

- Q1** (A) • Melting of wax
 (B) 1 Because food provides human with needed energy to all daily activities.

- 2 Because burdock seeds have spines that help them to stick to animals' fur or human's clothes.

- (C) 1 Matter. 2 Nursery.

- Q2** (A) • Algae → Clam → Starfish → Shark.

(B)

P.O.C	Solid state	Gas state
Motion of particles	They move a little bit.	They move very freely in all directions.
Arrangement of particles	They have an organized arrangement in a regular pattern.	They are not organized at all, and have a random arrangement.

- Q3** (A) 1 a 2 b
 (B) 1 Primary. 2 Soil.
 3 particles. 4 blood capillaries.

- Q4** (A) 1 increases 2 upright
 (B) 1 The volume of the balloon increases.
 2 The hawk moves to another ecosystem to search for food, or it dies.
 (C) By filtration process, because sand doesn't dissolve in water.

Model Exam 9

- Q1** (A) • d
 (B) 1 evaporation 2 tuber
 3 Veins – heart
 4 solar system – globe

- Q2** (A) 1 Consumers. 2 Producers.
 (B) 1 Because helium is lighter than air, so they rise up into the air.
 2 Because drinking seawater makes human dehydrate (lose water faster).
 3 Because copper is a good conductor of electricity.

(C) • It is used to examine one tiny particle that can't be seen by the naked eye such as a red blood cell.

Q3 (A) 1 vinegar 2 jellyfish

(B) 1 Nutrients in dead organisms aren't returned back to the ecosystem.

2 It forms ash.

3 A new dark-colored compound is formed.

Q4 (A) 1 Insects 2 Frying an egg

(B) 1 Freezing process. 2 Microplastics.

3 Glass.

Model Exam 10

Q1 (A) • Algae

(B) 1 Because water vapor particles lose energy, and changes from a gas state to liquid water.

2 Because plastic and wood are bad conductors of heat.

3 Because they gain thermal energy, so they change from a solid state to a liquid state.

4 Because helium is not poisonous or flammable.

Q2 (A) • a

(B) 1 water – carbon dioxide

2 top predators

3 physical

4 reproduction

Q3 (A) 1 b 2 a

(B) 1 Germination process.

2 Electron microscope.

3 Carbon dioxide gas.

Q4 (A) 1 ✓ 2 ✓

(B) 1 The magnet attracts the iron nail, while it doesn't attract the stone.

2 Water changes from a liquid state to a gas state.

(C) 1 Traveling by wind.

2 Coming out with animals' stool after eating them.

Government Exams Model Answers

Model ① Cairo – New Cairo Directorate

Q1 (A) 1 ✓ 2 ✗ 3 ✓

(B) • It is used to measure the volume of some matters.

Q2 (A) • Carbon dioxide

(B) 1 Melting process. 2 Food chain.

Q3 (A) • b

(B) 1 Because copper is a good conductor of electricity and can be stretched into a thin flexible wire.
2 Because when the water temperature rises, the coral reefs get rid of algae and its color turns completely into white.

Model ② Giza – 6th October Directorate

Q1 (A) • Rabbit

(B) 1 Because oil has mass and volume.
2 Because plant use sunlight to make its own food, then humans and animals eat plants to get energy.

Q2 (A) • Arteries

(B) 1 Ice cubes melt and become liquid water.
2 The plant can't make photosynthesis process so it dies.

Q3 (A) 1 b 2 b 3 a

(B) • Helium gas

Model ③ Qalyubia – Banha Directorate

Q1 (A) 1 a 2 b 3 a

(B) • Gas state.

Q2 (A) • Tuber

(B) • Because it decomposes dead organisms and recycles nutrients back into ecosystem.

(C) • The paper becomes ash (new substance with different properties).

Q3 (A) • ✓

(B) 1 Sticking to animal fur or human clothes.

2 It is used to fill balloons and blimps.

Model ④ Alexandria – East Directorate

Q1 (A) 1 a 2 b 3 b

(B) • It is used to measure the volume of some matters.

Q2 (A) • producers

(B) 1 Because it can't differentiate between a jellyfish and a piece of plastic in the water.

2 Because its particles are held together and cannot slide over each other.

Q3 (A) • x

(B) 1 It can't make its food through photosynthesis process and it dies.

2 The piece of wood floats and the coin sinks.

Model ⑤ Dakahlia – Educational Directorate

Q1 (A) 1 c 2 c 3 c

(B) 1 Because of formation of iron oxide (new substance with new properties) when iron reacts with water and oxygen.

2 Because copper is a good conductor of electricity and can be stretched into a thin flexible wire.

Q2 (A) • Carbon dioxide

(B) 1 Carrot → Rabbit → Snake → Hawk → Bacteria

2

Mixture	Compound
A form of matter formed of two or more substances don't combine chemically.	A form of matter formed of two or more substances combine chemically forming new substance.

3 Plants need sunlight, water and carbon dioxide as basic needs.

- 4 Coral reefs provide food and shelter for large numbers of marine organisms.

Q3 (A) • Stomata

- (B) 1 Producers: - green plant - algae - trees
Consumers: - snake - rabbit
2 be harmed - of flooding
3

P.O.C	Solid state	Gaseous state
Shape	Definite (Fixed)	Indefinite (Variable)
Volume	Definite (Fixed)	Indefinite (Variable)

- 4 Cutting a paper - melting of ice cubes.

Model ⑥ Damietta - Educational Directorate

Q1 (A) 1 c 2 b 3 d 4 d

- (B) • Its leaves become weak and pale green then it dies.

Q2 (A) 1 ✓ 2 x 3 x 4 x

Q3 (A) Classify the following words in these tables:

Human circulatory system	Plant transport system
Veins- Artery - Heart	Xylem- Phloem - Roots

- (B) 1 Caracals 2 Rabbits

Model ⑦ Menoufia - Ashmoon Directorate

Q1 (A) 1 runner 2 sun
3 algae 4 xylem- veins

- (B) • Because plastic is bad conductor of heat.

Q2 (A) • b

- (B) 1 Ice melts and becomes liquid water.
2 The plant can't absorb water and nutrients from the soil.

Q3 (A) 1 x 2 x

- (B) 1 Solid mixture.
2 Seed dispersal by wind.
3 Potato plant.

Model ⑧ Menoufia - Shebin El-Kom Directorate

Q1 (A) 1 x 2 ✓ 3 x

- (B) • Iron rusts and a reddish color layer is formed on iron.

Q2 (A) • stomata

- (B) 1 Because sound and light are forms of energy.
2 Because root hairs increase the amount of absorbed water and nutrients from the soil.

Q3 (A) • ecosystem

(B) 1

Burning paper is a chemical change.	Cutting paper is a physical change.
-------------------------------------	-------------------------------------

2

Bacteria are decomposers, because they decompose dead bodies.	Algae are producers, because they can make their own food through photosynthesis process.
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Model ⑨ Port Said - Port Fouad Directorate

Q1 (A) 1 energy 2 thermometer

- (B) • Its leaves become weak and pale green then it dies.

Q2 (A) 1 c 2 b 3 b

- (B) • Because they can make its own food through photosynthesis process.

Q3 (A) x

- (B) 1 Ecosystem 2 Solid state

Model ⑩ Kafr El-Sheikh - Educational Directorate

Q1 (A) 1 b 2 d 3 c

- (B) • Because plastic is bad conductor of heat.

Q2 (A) • x

- (B) 1 Decomposers 2 Oxygen

Q3 (A) Rusting of iron

- (B) 1 decreases 2 coral bleaching